SEX-DIFFERENTIAL MORTALITY, HEALTH CARE AND FAMILY PLANNING:

a study of the status of women in the NWFP of Pakistan

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When a female child is announced to one of them, his face darkens wrathfully: he hides himself from his people because of the bad news, thinking 'Shall I keep the child to my disgrace or cover it away in the dust?' (Quran, XVI, 58-9)

The burial of daughters is a noble deed. (Arabum Proverbia, I, p. 229)

The place of a woman is either in the home or in the grave. (Pushtu proverb)

ABSTRACT

The research on sex-differential mortality indicates that, contrary to the experience of other countries where, in the last century, females have consistently shown an advantage over males in life expectancy, the reverse has been observed in some parts of the Indian Subcontinent. Recent studies in the area have confirmed this female disadvantage in her chances of survival, especially in the reproductive ages.

The present investigation is a detailed examination of the hypothesis that:

> there are sex-differentials in mortality and health care, and low levels of family planning, to the disadvantage of females.

The data was collected by means of a census in 22 villages of Daudzai thana and Michni tribal area in the North West Frontier Province of Pakistan. The 2,070 households in the selected villages were interviewed by trained enumerators using a formal questionnaire. A detailed description of the area was given as a background to the study.

The analysis of the mortality results by the indirect methods based on retrospective questions on childhood mortality, and on orphanhood, widowhood and siblings status indicated that the standard application of these methods did not take into account the idiosyncrasies of the data. Therefore, the most reliable sections of mortality estimates from the different methods were used to construct the final life table. In the results a higher female than male mortality was observed in the reproductive ages. Supplementary evidence from deaths by cause corroborated these findings.

The examination of the health data indicated that there was a significant sex-difference in treatment of illness, cost of treatment and vaccination status to the disadvantage of females.

The family planning results showed that, although the majority of the population had heard of family planning, few couples practised it. For those who practised family planning the main source of supply was the family planning centre.

In the light of the evidence examined, it was concluded that there was validity in the hypothesis under investigation, and recommendations were made on the basis of the findings for the improvement of the status of women in the area.

PREFACE

It is surprising that, although, in the last few decades, so much has been done to eliminate various forms of discrimination, little has been done for the millions of women who live in the developing countries, and have to accept sex-discrimination as a birthright. The statements and laws designed to ameliorate their condition merely scratch the surface; they do not touch the roots of the problem.

It was to unveil some forms of this discrimination that this work was undertaken. It is ironic, however, that the very condition of women made it impossible to depict their disadvantage with full impact. Behind the statistics lie many poignant facts. The new-born baby girl who was denied her mother's milk because the mother was still breastfeeding her two-year old son. The twins that were born in one of our study villages, a girl and a boy: the boy survived and the girl died a month after birth; and yet we are told that females are biologically superior to males, especially in the first year of life. The female infant deaths that parents so often failed to remember because they were not considered important.

Some problems encountered by the author because of her sex appear comical in retrospect; nevertheless, they only contributed to the already innumerable obstacles of fieldwork. This study does not provide any straightforward conclusions or answers, but it is hoped that the findings and proposals for action will stimulate further research on the condition of women, so that a satisfactory solution may be found to the problem.

I would like to acknowledge my thanks to the IPPF who made the funds available for the fieldwork and to COPS of LSHTM who funded the data processing.

My greatest academic debt is to my professor W.Brass. His teaching will always be an example to his students. He has the rare ability to make the best of insufficient material not only with regard to data but also with regard to his pupils. If this work has any credit it is entirely due to his teaching. I would next like to thank my friend S.S.Kapoor who has always made himself available to answer queries; his encouragement and support have been invaluable. John Simon not only supported my application for funds but has also offered advice and help. Dr K. Hill always found time during his brief visits to the School to discuss problems. Dr Molnos, Mrs Swingler and Catherine Howell of the IPPF have shown me great kindness and sympathy.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In recent years it has been recognized that the shortage of women in some areas of the Indian Subcontinent is due to a relatively high female mortality, i.e. the imbalance of males to females is explained in terms of the relative disadvantage of the female in her chances of survival. This pattern of mortality is contrary to the typical pattern of sex-differential mortality observed in other parts of the world.

Studies which have investigated this problem: Davis (1951), Coale and Hoover (1959), Rakanuddin (1967), Visaria (1967; 1969), El-Badry (1971), to mention but a few, have not only consistently shown a higher female than male mortality, but have shown that this disadvantage experienced by females has increased in the last decades (Adlakha and Kirk, 1974, p. 396).

The causes underlying this excess female mortality are the practice of female infanticide, translated into modern terms by the neglect of female children (Wyon and Gordon, 1971, p. 195); maternal mortality (Ibid., p. 190; Adlakha and Kirk, p. 395); and sex-selective mortality from infectious diseases (Davis, p. 56). Reliable age-specific death rates are not available for Pakistan to confirm this disadvantage of females in her chances of survival.

Direct method: Age-specific death rates are used for the direct measurement of mortality, and for the construction of conventional life tables. Their computation requires information on the number of deaths by age and sex, over a specified time period, together with information on the population exposed to the risk of dying for the same period, by age and sex. The official sources of this information in Pakistan are the registration system, the census and surveys.

In 1947 Pakistan inherited a system of continuous registration of vital events, and a system of decennial censuses. Both systems had been introduced during the last decade of the nineteenth century. West Pakistan adopted the Births, Deaths and Marriages Registration act of 1886. This, unlike the Bengal Births and Deaths Registration Act of 1873, did not make registration compulsory. Attempts were made to introduce improvements, and in 1959 legislation was passed to make registration compulsory in the rural areas. However, in practice this was never achieved. As a result the statistics from this source are not only defective, in that they underenumerate events, but are also of poor quality, especially in terms of typical errors such as age misreporting (PGE, 1968, pp. 12-13).

The purpose of the census is to collect information on population size, sex, age distribution, education and occupation. In this capacity it has developed into an efficient system in Pakistan by achieving reasonably high quality and coverage. Attempts have been made in the last three censuses to use it as an additional source of vital statistics. Questions that measure mortality directly were included, i.e. the number of deaths that had occurred in the household during the reference period of twelve months preceding the census. The data collected referred to the number of deaths, and therefore allowed for the computation of crude death rates. No information was available for deaths by age.

The problems related to the above method of collecting mortality data are over-reporting or under-reporting because of dating errors, i.e. inclusion of events that have occurred prior to the specified time period or omission of events which occurred within the time period; recall lapse or omissions, especially of infants who have died after birth; and omissions of single person households which disappear with the death of the person (Brass, 1964; U.N. 1974, p. 50). In the case of Pakistan, the accuracy of the data from the censuses is questionable due to the heavy under-reporting of events, and for this reason information has sometimes had to be abandoned without publication (PGE, p. 15).

The other source of direct information on mortality are surveys. The two major surveys carried out in Pakistan were the National Sample Survey (NSS), a multi-round follow-up survey established in 1957, and the Population Growth Estimation experiment (PGE), a dual record system started in 1961.

In the multi-round survey each individual is identified in the first round, and all the changes which occur in the household are recorded in the subsequent rounds, which usually take place at an interval of six months. In this way the age of an individual who has died since the first round will be available, together with the population at risk which is enumerated at each round, so that age-specific mortality rates can be calculated.

This method produces more satisfactory results, and reduces some of the errors of dating and omissions that occur in the census or single-round survey. However, it has other problems which include the omission of deaths of persons who move in or out of the survey area between rounds; and infants who are born after one round and die before the next. Furthermore, this method of data collection is costly, and there is usually a long delay in the publication of results (U.N., 1974, p. 201). The data on deaths from the NSS, which was primarily an economic survey, were of such poor quality that they were not published (PGE, p. 16).

The dual record system is based on the collection of data from the same sample by two independent data collection systems. The continuous registration of events is maintained in the sample area; and a periodic cross-sectional survey is made of the same area at fixed intervals of three to six months. In the initial round the entire population of the sample area is enumerated. During the subsequent round the changes that have occurred in the composition of the household are recorded. The enumerators of the periodic surveys operate independently of the registrars.

The results of the two systems are matched, event by event. In case of discrepancies, the information is checked by a further visit to the household. The number of events missed by both operations is estimated by the Chandrasekar-Deming correction (1949, pp. 101-115).

The major limitations of the application of this method in Pakistan have been the same as those encountered in other parts of the world. These include the difficulties of matching records from the two sources; the administrative problems of maintaining independence of the two systems of recording; and finally the shortcomings of the Chandra-Deming technique. In this model, for the correction factor to be unbiased, it is assumed that omission of events by the two systems should occur independently, and that the matching errors cancel out. These assumptions have been questioned. For example, it is found that events of certain types may have a greater risk of omission by both registrars and enumerators, i.e. deaths of single person households; or there may be errors in the matching of an event with its counterpart which introduce an upward or downward bias in the correction. In practice the correction calculated is usually too small to account for the events omitted (PGE, pp. 54-74; Brass, 1971a, 397-412; U.N., 1974, pp. 216-223).

Indirect approach: The indirect approach to mortality is based on the cumulative effect of past deaths on the population rather than the number of deaths over a given period. The common feature of all the indirect methods is that estimates derived from them are averages of mortality experience over long periods. The indirect methods used in Pakistan have been quasi-stable age distribution techniques, in which data from the census is used in conjunction with models, i.e. model life tables or models of stable population (U.N., 1967a); and the estimation of survivorship probabilities from successive censuses (Carrier and Hobcraft, 1971, pp. 17-21). The indirect or retrospective methods known as the Brass methods have been extensively used in Africa and more recently in Bangladesh, but to date they have not been applied in Pakistan to estimate mortality. The method is based on the use of retrospective questions on mortality in censuses and surveys. These past events are then converted into estimates of life table survivors by Brass techniqmes.

The method of estimating infant and child mortality from proportions dead from the total number of children ever born by women in the conventional five year age groups was developed by Brass (1963, pp. 294-301), and modifications were suggested by Sullivan (1972, pp. 79-97). The success of this method lead to the develoopment of the orphanhood method of estimating adult female mortality from proportion of respondents with mother alive (Brass and Hill, 1973, pp. 111-123); Blacker and Hill worked out a set of conversion factors for estimating adult male mortality from proportion of respondents with fathers alive (Brass, 1975, pp. 77-84). The widowhood and the siblings methods have been the most recent developments to estimate adult mortality. In the former the proportions with first spouses alive are converted into life table probabilities by the use of conversion factors. In the latter the proportion of surviving siblings of respondents are converted into life table survivorship values (Hill and Trussel, 1977, pp. 313-334).

The link between childhood and adult mortality is established by the logit life table system ($Y_x = \alpha + \beta Y_x^S$). The

Brass Model Life Tables are derived mathematically, and not from the empirical experience of populations like the United Nations one-parameter Life Tables (1956), or Coale and Demney's four sets of single parameter Model Life Tables (1966). In practice, the use of single parameter models has resulted in an underestimate of infant mortality in populations analyzed which is said to be higher than predicted by the models corresponding to the levels of adult mortality of these populations (Adlakha, 1972, pp. 589-601).

The Brass system is more flexible, because it is determined by two parameters, α and β. The α denotes the general level of mortality, and can be fixed from the measures of child mortality. β, on the other hand, determines the relationship between adult and child mortality. The value of β is estimated from adult survivorship ratios, and the whole life table is thus defined. Therefore, for a given value of α with β equal to one, the q_x values will be higher for the adult ages, than when β is less than one for the same value of α. This relationship of adult mortality to infant mortality is not underlined by the use of single parameter life tables (Brass, 1971b).

It was in the light of these developments that the present study was conceived. It was hoped that by the application of the Brass indirect methods, which have been successfully used in many parts of the developing world, the resultant description of sex-differential mortality would be more satisfactory than that obtained by other methods to date. Supplementary information on health and family planning was also collected.

The study was funded by the International Planned Parenthood Federation (Appendix 1). It was carried out in twenty-two villages of Daudzai thana and Michni tribal area in the North West Frontier Province of Pakistan. In Daudzai an [illegible] experimental project to improve the social and economic condition of the masses is being conducted by the Pakistan Academy for Rural Development (PARD). But no demographic survey has hitherto been carried out in the area.

1.2 AIMS OF THE STUDY

The aims of the study are:

1. To give a brief descriptive profile of the role and position of women within the general perspective of the community and its socio-economic structure; with regard to the *rites de passage* and disease; and finally in the context of education and development programmes.
2. To determine whether there is sex-differential mortality.
3. To determine whether there is sex-differential health and health care and low levels of family planning.

It should be mentioned at this point that government bodies and international organizations are committed to improving the status of women by providing them with the opportunity to reduce fertility through family planning. It is argued that a change in the present childbearing patterns will not only improve the mother's health but also diminish female mortality, especially in societies where mortality in childbirth is relatively high, and further, that this change will diminish poverty levels by reducing population growth. The final aim of this study is to make recommendations to improve the status of women on the basis of the findings.

1.3 THE HYPOTHESIS

It is customary for scientific studies to postulate, on the basis of what is already known, a plausible theory to account for the phenomenon in question. The hypothesis is then tested to see whether it does or does not conflict with the facts, and on that criterion it is accepted or rejected. The following hypothesis was therefore developed as a point of departure for the study:

> There are sex-differentials in mortality and health care, and low levels of family planning in the community, which are to the disadvantage of females.

1.4 DEFINITION OF STATUS

Sociologists such as Linton define status as a position in a particular pattern. Each individual has many statuses, since each individual participates in the expression of a number of patterns. The general status of any individual is the sum total of all statuses which he occupies. It represents his position in relation to the whole society. A status, as distinct from the individual who may occupy it, is a collection of rights and duties (Linton, 1961, pp. 202-208). The United Nations Declaration on the Elimination of Discrimination against Women gives the following indicators of the status of women: female literacy; women's employment, civil laws, i.e. age at marriage, property rights, social security, polygamy and divorce; political rights and roles, including the right to vote and form trade unions; and the status of women in the family (U.N., 1967c, pp. 113-117).

In short, status is a means of measuring the freedom and rights of women in any sphere of life. This study is chiefly concerned with the status of women in relation to the demographic processes: mortality, health and family planning.

1.5 VARIABLES USED IN THE STUDY

The variables considered in the study can be divided into four main groups.

1. Background data about the population.

This involved a description of ecological, ethnological, socio-economic and religious facts about the study population. The major part of this information was obtained through observation and secondary sources, supported by data from Part I of the questionnaire.

2. Basic demographic data.

These included the identification of the household and the individual by age and sex.

3. Specific demographic data.

The following specific data on infant, childhood and adult mortality, and fertility were collected:

Mortality

a) Number of children dead among children ever born to women.

b) Orphanhood status; widowhood status; and sibling status.

Fertility

a) Current fertility, i.e. children born to women in the twelve month period preceding the study.

b) Total fertility, i.e. total number of children ever born to women.

4. Health and family planning.

These included the following:

Health

a) The last illness episode; the form of health care sought; and the amount paid for the treatment.

b) Incidence of tuberculosis.

c) Prevalence of vaccination.

Family planning

a) The knowledge of family planning.

b) The use and source of family planning.

1.6 STUDY PRESENTATION

The study is divided into seven chapters and ten appendices. Chapter 2 reviews the literature on the subject to the present day. Chapter 3 provides background information on the area. Chapters 4, 5 and 6 describe the methodology and results of fieldwork, mortality, health and family planning. Chapter 7 summarizes the conclusions of the investigation and makes recommendations on the basis of the findings.

This work does not claim to be more than an exploratory investigation. Its limitations have been fully recognized; it was conducted as a one-man study in difficult conditions in virtually uncharted areas, and was further limited in terms of time and funds. Nevertheless it is hoped that it will prove useful both with regard to the methodology and the results. The employment of the census method helped to overcome several problems inherent in small samples, and the Brass retrospective techniques, which have not hitherto been applied in Pakistan, made it possible for a small study with limited resources to obtain estimates of mortality. The extent to which the results are representative of other parts of Pakistan is not clear. However, even if it is considered limited in view of the geographic situation and the socio-cultural patterns of the study population, it is hoped that it will raise some interesting questions on the subject which, with further research, will ultimately lead to more accurate knowledge.

Those publications which are important and directly relevant to the study are listed in the bibliography, and references to these works are given within the text by the author's name and the date of publication. Other references are given in the footnotes at the end of each chapter.

CHAPTER 2

REVIEW OF LITERATURE

2.1 INTRODUCTION

This chapter first gives a general chronological survey of observations made on sex-differential mortality. The evidence is based on the experience of European populations. The history of the phenomenon in the Indian Subcontinent is then reviewed from the census reports of India, and finally specific studies on the subject, with special reference to India, Pakistan and Bangladesh, are examined.

2.2 GENERAL SURVEY

It has been observed from the earliest writings on the subject that, at almost every stage in the life span of man, the rate of male mortality exceeds that of females. In 1676, Captain John Graunt, in his Natural and Political Observations, reported that more men are born and that more die, and that there are more men than women in the population. But he had heard physicians claim that they had two women patients to every man, which would mean, 'if the number of burials answered in proportion to the sicknesses,' that more women were dying than men. Graunt concludes that either the physicians are more successful at curing women, or else that 'men, being more intemperate than women, die as much by reason of their vices, as women do by the infirmity of their sex.' In his view the surplus of men in the population was agreeable to the Law of Nature, that is the Law of God that man should be monogomous.[1]

M. Moheau (1778), in the chapter on sex-differences in mortality in his treatise on the French population, wrote that the superiority in the number of males at birth is lost from the first year of life, and that this disadvantage continues to increase with age, so that the excess of females in the population after sixty years from birth is considerable. These findings seemed contrary to the laws of nature, because he believed that since the female matures earlier than the male, her span of life should be shorter. He concluded that the disadvantage experienced by males was not due to their physical constitution, but to other causes, in particular to the dangerous and strenuous life led by men.[2]

A similar conclusion was reached by Maitland who believed that the general preponderance of males was designed by nature as a remedy against the destruction of men by war and 'other incessant contingencies which males are more obnoxious to both by land and water'.[3] All these authors concur that the social and environmental factor plays a major role in the sex-differences in mortality. A. Quetelet (1835) accepted the truth of this theory with regard to adult mortality, but was the first to attribute the inequality in the number of deaths of infants to the detriment of males, both before and immediately after their birth, to physiological causes.[4] L.I. Dublin et al. (1949) likewise subscribed to the thesis that the social and environmental factor plays an important role in sex-differential mortality, but emphasized that by itself it cannot explain the whole difference. There is evidence to suggest, from other species, that the phenomenon is primarily biological (p. 129).[5]

A. Ciocco, in a study of stillbirths and abortions reported from 1925-1934 in a selected birth registration area of the United States, showed that the preponderance of male deaths was greatest during the early period of uterogestation and decreased with the duration of pregnancy: the ratio of male to female deaths declined steadily from 4.31 in the second month to 1.12 in the seventh month; the overall ratio was 1.35.[6] In the life table mortality rates computed by Dublin et al., from data relating to the years 1929-31 for white persons in the United States, the sex ratio for the first two months of life was a little lower than that observed by Ciocco among stillbirths in the ninth month of uterogestation, i.e. 1.31 as opposed to 1.35 (Dublin et al., p. 134). The ratio tended to decrease thereafter. For the first year of life as a whole, the ratio of male to female mortality was 1.27.[7] The data also showed that the mortality of women was lower than that of men at all ages, including the reproductive years, although the relative difference between male and female mortality at this period was smaller.[8]

G.J. Stolnitz, in his survey of mortality trends, has shown that, contrary to what is generally accepted, higher female than male mortality, measured by age-specific death rates, was common at some ages in most parts of the world during the major part of the nineteenth century. Among Western populations lower female mortality at all ages only became general as recently as the 1930's. Furthermore, he points out that this higher female mortality occurred not only in the reproductive years but also at other ages. For example, in Western countries in 1840-1910, the highest female mortality relative to males, i.e. over 50%, occurred in the pre-reproductive ages of 7-12; followed by the group 12-17, when fertility is lower than at subsequent ages. Similar evidence is presented by Stolnitz from data on Eastern Europe, Latin-America, Africa and Asia. Finally both Eastern Europe, 1870-1910, and the Western world at the end of the last century, show that female mortality is relatively lower for the group 17-27 than for the ages that precede or succeed it, i.e. before heavy childbearing and when fertility has begun to decline.[9]

However, with regard to longevity which is measured by life expectancy or the average duration of life in the face of risks of death, females in Europe throughout the last century have consistently shown an advantage over males at birth and other ages. The only exception to this universal pattern was Ireland in the 1920's. After the 1930's female life expectancies have been higher for all ages to seventy in the Western world, and since the last quarter of the century in Eastern Europe and other parts of the world (Stolnitz, 1956, pp. 22-32).[10]

In recent years the only exception to the general rule that females experience a longer life expectancy at birth and other ages has been observed in the Indian Subcontinent (Dublin et al., 1949, p.129).

2.3 HISTORY OF THE PHENONENON IN THE INDIAN SUBCONTINENT

The phenomenon was first brought to light when the Superintendents of the earliest censuses drew attention the preponderance of males in the census returns: 'The dearth of women is greatest in the north-west of India, and, gradually, becomes less noticeable towards the east and south, where it is eventually replaced by a deficiency of males' (India, 1901, p. 107). The general distribution of the sexes remained much the same when the effects of migration had been discounted, except in the case of Eastern India where there had been a massive influx of male labourers. Migration did not provide an adequate explanation for the high sex ratio of males to females of North-West India. In this area the 'natural' male population was even higher than the enumerated male population, a clear indication that males had been emigrating and not immigrating. The Superintendent therefore concluded that the excess of males could only be due to three possible causes: a less complete enumeration of females; a relatively larger number of male births; or a higher female than male mortality in the population. He emphasized the last of these possibilities.

It was also pointed out that the deficit of females in the 10-15 age group was compensated for by an excess at the two extremities, 0-5 on the one side and 20-25 on the other. It was believed that the general inaccuracy of the returns for females was further exaggerated, not only by intentional misstatement, but also by an unconscious tendency to minimize the ages of unmarried girls and to overstate those of the married. A similar fall in the proportion of females to males in the age group 10-15 was found in the death returns 'where there can be no specific motive for concealment of nubile females'. The Superintendent was of the opinion that many deaths belonging to this age group had been wrongly assigned to those above and below it, because he noted that 'the proportion of females at the ages 10-15 varied inversely with the number who are married at this period of life'. For example the province which had the lowest proportion of females in the age period 10-15 was Bengal where 57% were married before the age of 15. The ill effects of early marriage, premature childbearing and unskilful midwifery were thought to have caused a genuine decline in the proportion of females in those ages after due allowance had been made for the fictitious deficit attributable to age misstatement.

The growth of the female population in the United Provinces and Rajputana during the decade 1891-1901 was ascribed 'not only to their inherently greater capacity for resisting the ill effects of famine, but also to the decline in the birth rate which occurs in a famine year, and the consequent reduction in the number of deaths at parturition'. In 1897, a year of famine, there were far fewer female deaths at ages 15-20 and 20-30 than occurred during a normal year. From the age of 30 onwards it was found that the two sexes had much the same rate of mortality. When the figures were analyzed according to religion, the Hindu female showed a higher life expectancy at the age of 30 than a male of the same age and religion. In the case of Muslims, on the other hand, the males had a slight advantage over females. This was explained in terms of the prohibition of widow remarriage amongst the Hindus: 'the Muhammadan female is more prolific and pays for this by a shorter span of life' (Ibid., pp. 110-118).

The 1901 Census Report emphasized that, apart from maternal mortality, there must be conditions in India that are adverse to the female chances of survival. 'It is significant that where the proportion of females is lowest, i.e. in the Punjab and the adjoining tracts in Sind, Rajputana and the United Provinces, large sections of the population are, or were formerly, suspected of practising female infanticide'. Although by 1901 the practice was far less widespread, the birth of a female child was, and to this day still is, unwelcome. Consequently a daughter receives less attention than a son, with the result that in times of shortage, it is invariably the girls who suffer (Ibid., p.115). Finally, a third form of mortality, discussed in the 1911 Census Report, to which females were more liable to succumb, was death from infectious diseases such as malaria, plague and influenza. Females were particularly vulnerable to this form of mortality because they were usually confined indoors and had to nurse the sick. In Bombay, for example, female mortality reached a peak during the influenza epidemic of 1918.

The author of the 1901 Census Report was criticized for having rejected the possibility of female underenumeration as a decisive factor influencing the sex ratio. Dr George van Mayr doubted that the Indian statistics could prove that there was a genuine deficiency of females. His objections are listed in the 1911 Census Report. He considered it improbable that there should be such a large discrepancy between the proportions in India and Western Europe. He pointed out that the inhabitants of India are not only reticent regarding their women, but in some parts they are considered of very little account; and he observed that, according to the age statistics, the proportion of females was lowest between the ages ten and twenty, a time of life when there would be a tendency to conceal the existence of unmarried females. It was therefore natural to suppose that female census returns had been incomplete. The increasing accuracy of each succeeding census had been accompanied by a rise in the proportion of females. This evidence indicated that there was some connection between the two phenomena. Finally, the vital statistics for the decade, 1891-1900, recorded a relatively low female mortality (India, 1911, p. 209).

In reply to these objections the Superintendant maintained that the enumerators had been carefully trained and their work thoroughly checked. 'Special stress has been laid on enumerating everybody, and the particular attention of supervising officers had been directed to the necessity of securing a complete return of females' (Ibid., p. 210). He estimated that if India had the same sex ratio as Western Europe, one would have to assume that a total of thirteen and a half million females had been omitted from the 1911 census returns. However, not only did enquiries by supervizing officers fail to bring to light any special tendency to omit females from the enumeration, but the deficiency of females was most marked in the Punjab where the census staff was known to be more efficient than elsewhere in India. Furthermore, if reticence regarding women had any effect, it would have reduced the proportions for the Muslims more than those for Hindus, but in almost all parts of India the former were said to have a higher proportion of females than the latter. The lowest was among the Sikhs who, on the whole, were the 'least reluctant to talk about their women'. After 1901 the theory of female underenumeration was no longer corroborated by a decreasing sex ratio of males to females. In fact, with each succeeding year, there was a steady fall in the proportion of women in the Indian population, in spite of the increasing accuracy of the census.

In the 1921 and 1931 census reports attention was transferred from the sex ratio at death to the sex ratio at birth. S.de Jastrzebski put forward the theory that masculinity in a population is affected by race.[11] Although the author of the 1921 Census Report admitted that omissions in the reporting of vital events were more numerous amongst females and that in the Punjab the reporting of female births was avoided, he argued that birth statistics indicated that 'in regions in which the Mongolian and Dravidian race element is strongest, that is in Burma and the south and central tracts of India, there is a higher proportion of females born than in those areas in north and north-west India in which the Aryan or Semitic strain prevails' (India, 1921, p. 144). It was further stated that the census figures supported the conclusion that the Dravidian castes had a higher proportion of children (Ibid., p. 148). These findings appeared to give substance to Jastrzebski's thesis that masculinity is slightly higher in the first than in subsequent births. In order to test the theory that the sex of subsequent births might be influenced in the direction of masculinity or femininity by the sex of the first child, a sample survey on fertility was carried out for the 1931 Census which included a statement on the sex of the first born. The results were not conclusive, although there was a correspondence between the sex ratio of first births and the sex ratio of the natural population. Baluchistan, for example, had only 566 first born females per 1,000 males and 832 in the natural population. The figures suggested an insufficiency of female births in north-west India. The author of the 1931 Census Report was of the opinion that the caste system itself tended towards a preponderance of masculinity. He referred to E. Westermarck's History of Human Marriage, where it is maintained that a mixture of race leads to an increase in the proportion of females whereas inbred or pure-blooded societies produce an excess of males. The Talmud is quoted as saying that mixed marriages produce only females. 'Caste therefore would appear to be of definite assistance to the Hindu in his superlative anxiety for male children; moreover since the higher the caste, the stricter, in the past at any rate, the ban on external exogamy, this tendency would show more patently in the higher caste and explain why the proportion of females to males increases in inverse ratio to social status' (India, 1931, p. 197).[12] Furthermore, the author of the census report believed that the practice of infanticide in families where daughters were most numerous would ultimately perpetuate strains in which males predominated. However, the neglect of female children and too frequent maternity which were both known to exist among certain warrior castes such as the Rajputs and Jats would indicate that the deficiency of females in the higher castes was largely a result of sex-differential mortality. Among primitive tribes and low castes, who had the highest female ratio, marital cohabitation did not usually take place until approximate maturity was reached. It was also pointed out that the absence of epidemic diseases in the United Provinces during the 1921-1931 decade led to a decline in the proportion of female deaths at every age except the reproductive years, 15-30, which implied that maternal mortality was still high (Ibid., p. 204).

2.4 SPECIFIC STUDIES

In recent years there have been specific studies, the Indian study, the Pakistan study and the Bangladesh study, that have investigated sex-differentials in mortality in the Indian Subcontinent.

2.4.1 The Indian study

P.M. Visaria (1967), in his study of the sex ratio of the population of India and Pakistan, examined sex-differentials in mortality indicated by registration data for the Provinces of British India, 1901-1947, and for selected States for 1947-1951. His investigation also includes information from the National Sample Survey, 1958-59: the Ramhagaram Health Centre; the Khanna study; and finally from research on Indian communities living abroad.

The shortcomings of the ratios of death rates are fully recognized by Visaria. The ratios when close to unity, i.e. .98 or .99, can be affected by a small underenumeration of women or the rounding of figures. However, even a ratio of unity demonstrates a deviation from the Western experience. The analysis of the averages for the decade of sex-age-specific death rates registered in the Provinces of India during 1901-1930 showed that, in the Punjab, there was higher female mortality relative to males at almost all ages. All other provinces, with the exception of Bihar and Orissa, manifested a higher female death rate in the reproductive years and, unlike the Punjab, an advantage in the older ages. Visaria points out that the areas that did not show higher female mortality were areas where there had not been a deficit of females in the population. Two life tables constructed from the registered age-specific death rates by sex gave an expectation of life at birth of 24.41 and 21.97; 32.50 and 31.27, for males and females respectively.

The sex ratios of the life table death rates prepared from the National Sample Survey for 1957-58 showed a smaller female disadvantage in mortality relative to males compared with the other sources. The bulk of the excess female mortality was concentrated in the reproductive years, 15-44, and in the group 1-4. Above the age of 45 females indicated an advantage. However, even from this data, Visaria was able to establish a correlation, in certain areas, between a high masculinity in the population and high female mortality.

Visaria next examined data from the Ramnagaram Health Centre and the Khanna study. The life table constructed from age specific death rates for a total of 3204 deaths recorded in the Health Centre for the years 1950-52, gave an expectation of life at birth of 53.4 years for males as opposed to 52.6 years for females. The excess female mortality shown by the sex ratio of the $_nq_x$ values occurred in the reproductive ages, with a female advantage in her chances of survival in the higher ages. The India-Harvard-

Ludhiana Population Study known as the Khanna Study, carried out during 1956-59 in eleven study villages with a population of 12,000, recorded the highest sex-differential in mortality, i.e. expectation of life at birth of 54.24 for males and 45.52 for females.

Visaria concluded that the excess female mortality observed in the Khanna study could by itself adequately explain the masculinity of the population in the study villages. The sex ratio of the enumerated population was 1189 males per thousand females, as compared with 1251 males per thousand females when calculated according to the ratio of the expectation of life at birth of the sexes and a sex ratio at birth of 105 males per hundred females. The sex ratio dropped to 1206 when weighted by the age distribution of the observed population of 1951 to allow for population growth.

In recognition of the deficiencies of the vital registration system in India and the limitations of survey data, Visaria further supplemented his evidence by the analysis of sex-differential mortality observed among Indian communities abroad, i.e. Mauritius, Malaya, South Africa, Fiji Islands and Singapore. The results showed the consistent pattern of higher female than male mortality in the reproductive ages, and in the case of Malaya (1956-58) and South Africa (1945-47 and 1950-52) even beyond the reproductive ages.

The conclusions of the study are that the available evidence on sex-differential mortality, prevalent in India and among Indian communities abroad, can explain the masculinity of the population of India and Pakistan.[13]

2.4.2 The Pakistan Study

A.R. Rukanuddin carried out a similar investigation for Pakistan in order to determine the cause of the high masculinity of the enumerated population in 1961, i.e. a sex ratio of 1111 males per thousand females.

The deficiencies of the vital registration system in Pakistan made it necessary for Rukanuddin to use as his material the results of the Population Growth Estimation Experiment. In 1962 the PGE project registered a total of 412 male and 384 female deaths in the Eastern Wing of the country; the corresponding number of deaths registered for the Western part of the country were 414 and 376 respectively. The sex ratios of the age-specific death rates showed a higher female than male mortality. When the ratios for the East and West were analyzed separately, the higher female mortality occurred at almost all ages in the East as opposed to some ages in the West. This was largely due to age misreporting which resulted in a tendency to inflate the age-specific death rates in some groups to the detriment of others.[14]

Rukanuddin concluded that the excess of males in the population could be explained by the relativeley higher female than male mortality observed in the PGE. A similar conclusion was reached by A. Ahmad (1972) through estimates of mortality obtained from intercensal survivorship ratios, derived from the 1951 and 1961 censuses.

2.4.3 The Bangladesh study

The Bangladesh Retrospective Survey of Fertility and Mortality (BRSFM) was carried out in 1974. Retrospective questions on mortality were asked and estimates of mortality were obtained using the Brass methods. According to the results of this study, with regard to sex-differential mortality, females showed a slight advantage over males in early childhood, i.e. the ages 0-4. The expectation of life at birth recorded for males was 45.80 years, as opposed to 46.62 years for females. These findings were not in agreement with the results of other studies carried out in the area. The PGE recorded an expectation of life at birth of 45.85 years for males and 45.45 for females; whereas the Cholera Research Laboratory data for Maltab <u>thana</u> in Comilla district, 1966-69, showed an expectation of life at birth of 51.03 years for males and 49.50 years for females (BRSFM, 1977, p. 94).[15]

2.5 THE CAUSES OF SEX-DIFFERENTIAL MORTALITY

The review of literature on sex-differential mortality in the Indian Subcontinent has consistently shown females at a disadvantage. To date there has been no specific study on the causes underlying the relatively high female mortality, because of the defective statistics by cause of death. Nevertheless there is fragmentary evidence to indicate that the causes of mortality differential are female infanticide or the neglect of female children; maternal mortality; and mortality from infectious diseases. These causes are prevalent in those areas of the world where the status of women is low, i.e. in certain agrarian and patriarchal societies.

Women are believed to hold an inferior position relative to men because of their limited participation in economic production. In the majority of primitive societies where roots and seeds are cultivated men and women are held equally responsible for production. Men clear the land by 'slash and burn' techniques, but women are the primary cultivators. On the other hand, in regions of plough cultivation, where the main farming instrument, the plough, is used by men helped by draught animals, women's work is generally subordinate to that of men. In these societies women contribute mainly to harvest work and to the care of domestic animals. Sometimes they are released from all farm work and live in seclusion. The main features of peasant agricultural societies which are patriarchal are as follows: the men till and cultivate the soil; the family is the primary unit of production and consumption; and the man is the head of the family. Women in these cultures marry early; they are expected to produce several male children; and they often live in seclusion according to the requirements of the pardah system (Boserup, 1970).[16] It is believed that all these factors contribute directly or indirectly to a higher female mortality.

2.5.1 Childhood mortality

In some farming communities in northern India, where the typical features of a patriarchal society are found, i.e. where women do little work in agriculture and parents know that a daughter in due course will cost them a dowry, infanticide has been prevalent (India, 1911, pp. 215-218; Visaria, 1967, p. 370).[17]

In modern times female infanticide has been prohibited by law, but the motives for indulging in this practice remain and are manifested in a general neglect of female children. This is particularly apparent in the second year of life, where although the expected number of deaths should be equally distributed between males and females, cultural factors can create an imbalance. The Khanna study showed that the major difference between males and females occurred at the weaning period, i.e. at the age of 6-24 months. The death rate recorded for the first five years as a whole was 74 deaths per thousand population among females compared to 50 deaths per thousand among males. It was also found that malnutrition was more pronounced among females (Wyon and Gordon, 1971, p. 193; Gordon, Wyon and Ascoli, 1967, pp. 372-73). This may be partly due to the belief that milk is not good for girls.[18] Preference for males is also manifested in the tendency to care more for sick boys than for sick girls. K.S. Batanagar found that although among the Rajputs female infanticide was a tolerated practice, yet when interrogated about the possibility of the existence of female infanticide, the villagers denied its existence. But it was admitted that when a female child fell ill, the care taken was casual, and if she died there was little sorrow. Batanagar cited the example of a cultivator who had six sons and six daughters; the daughters fell ill and died. In his view 'there has been a transition from violence to non-violence in keeping with the spirit of the times.'[19]

2.5.2 Maternal mortality

In African communities of shifting cultivation women are valued both as workers and as mothers. Polygamy is an asset and a man has to pay a brideprice for a wife. On the other hand, in the typical peasant society, where men do most of the work, women are valued above all as mothers. The status of the barren woman is very low compared to the mother of several sons. Polygamy is rare and only practised among the richer farmers or among those whose first wives are barren. In these communites it is the girl's family who pays the dowry. There are exceptions, i.e. settled agrarian societies with a high incidence of polygamy and the payment of a brideprice, but these are societies in transition. (Boserup, 1970, p. 47).

In the patriarchal agrarian type of society birth rates are high. The studies reviewed on the Indian Subcontinent have already demonstrated that female mortality is highest in the reproductive ages. The mortality data compiled by the United Nations, published in 1953, showed no association between high fertility and the mortality of women in the reproductive ages (U.N., 1953, p. 137; Dublin, 1936, pp. 107-116). However, there is evidence to the contrary from the Hutterite populations of the United States and Canada. The members of this group do not practise birth control and have a high recorded fertility. In the years 1914-50 the crude birth rate was 45 per thousand, and the completed family size, i.e. the number of children ever born to women by age 45, was 9.9. The general level of mortality among the Hutterites was low in those years because of the availability of a good health service. Nevertheless the death rates of women were consistently higher at every age, except for children under 15 and people over 60 years of age. This study suggests that a high number of pregnancies has a direct effect on maternal mortality, and, by lowering resistance to disease, leads to general morbidity, even in the presence of moderately good medical care (Eaton and Mayer, 1954, pp. 14-20).

In agrarian societies not only does childbearing start early and continue more or less uncontrolled, but also deliveries occur under the most primitive and unhygienic conditions, attended by a relative or an untrained midwife.[20] It is believed that these are the main contributory factors to the relatively high female mortality in the reproductive ages in these societies.[21]

There is also evidence to suggest that repeated pregnancies followed by prolonged lactation periods will produce a sustained need for high quality protein in the diet. If these needs are not met it can result in the 'maternal depletion syndrome' which causes premature aging and early deaths among females (Wray, 1971, p. 431). Two

Indian studies have shown a higher fatality among females than males from deaths due to avitaminosis and other deficiency diseases during the decade 1951-61. The data from Poona and Bombay cities recorded 515 female cases suffering from avitaminosis and 228 cases of anemias as opposed to 415 male cases of avitaminosis and 190 cases of anemia (Jain, 1967). C. Coplan, in his study of nutrition in India, found that malnutrition was widespread among pregnant women from poor families. Over 30% of these women had been suffering from severe anemia during the last stages of their pregnancy (Coplan, 1967).[22]

2.5.3 Mortality from infectious diseases

It was thought by Census authorities in British India that women were more prone to infectious diseases because of their cultural condition: women spend more time indoors; they nurse persons suffering from plague or influenza, and were therefore more exposed to infection through the rat-flea or the influenza virus (India, 1911, p. 212). Plague and major influenza epidemics are events of the past, but even today, it is believed that females are more prone to infectious diseases such as tuberculosis.

The evidence from several Western countries shows that tuberculosis mortality is sex-selective and it tends to vary with age. The incidence seems to be higher among females than males between the ages 5-24 or 10-30, whereas males are more vulnerable at the very young ages and ~~particulary~~ at the older ages.[23]

K. Davis has stated that tuberculosis kills more people in Pakistan than in India; and contrary to the experience of most advanced industrial societies, the tuberculosis rate is greater among females

A.C.Ukil found that female death rates in Calcutta from tuberculosis for the ages 15-20 were five times as high as the male rates.[24] After the age of 30 males suffered a disadvantage in the the urban and industrial communities, but not in the rural areas. One of the main reasons for this high rate of tuberculosis infection among females is believed to be the pardah system. The influence of this factor is manifested in the enhanced indidence of infection immediately after the age when girls begin to be confined to their homes (Davis, 1951, p.56). R.A.Riste has shown the effects of early seclusion of Muslim girls on the incidence of tuberculosis: infection rates in the 10-14 age group was 44.6% among Muslim girls, as against 18.8% among Hindu girls.[25] K.K. Mathen and P. Sinha have also pointed out that the excess of female mortality over male from tuberculosis, from sex-specific crude death rates calculated from registration data for Bombay, was significantly higher among Muslims than among Hindus.[26]

2.6 CONCLUSION

The review of literature on sex-differential mortality has shown that with regard to Western populations it was believed, since the time of John Graunt (1676), that male mortality was higher than female mortality. The emphasis of earlier writers was on social and environmental factors as the major cause of the differential. More recent research has emphasized biological factors, especially in the first year of life.

Stolnitz, in his study of sex-differential mortality in the major regions of the world, observed that the provalence of of lower male than female age-specific mortality rates at some ages has been far greater than is generally assumed. Such rates were not only common in Africa, Asia and Latin America, but also among Western populations. Also the greatest sex-differential has occurred in ages other than the reproductive ages. However, with regard to longevity, measured by life expectancy, females have consistently shown an advantage over males. The only exception to this general rule is the experience of the Indian Subcontinent.

The phenomenon was first brought to light in India in connection with the high masculinity of the population. In 1901 it was believed that the deficit of females in the total population was due to a relatively high female mortality. In the following decade it was disputed that the under-enumeration of females was a more plausible explanation. The rise in the sex ratio recorded by subsequent censuses did not appear to substantiate this interpretation. In the 1920's prominence was given to Jastrzebski's theory that a high sex ratio at birth is associated with certain racial groups.

In a recent study Visaria examined information on mortality from registration data, a health centre, the Khanna study and among Indian communities living abroad in Singapore, Malaya, Mauritius, Fiji Islands and South Africa. His conclusions supported the original thesis that the sex ratio of the Indian Subcontinent was largely a product of sex differentials in mortality to the disadvantage of females. Rukanuddin came to similar conclusions after his analysis of PGE data. The BRSFM, on the other hand, found that the female expectation of life at birth was higher for females than males, although this advantage was soon lost after childhood. These results of a higher life expectancy at birth for females are in disagreement with other studies carried out in the area.

There are no specific studies on the causes underlying high female mortality, no doubt because of the poor quality of the data. However, there is fragmentary evidence to suggest that sex-differentials in mortality are unfavourable to females in societies where their status is low, i.e. in certain agrarian societies. It is believed that the chief reason for their inferior status is their limited participation in agricultural production.

Women in these cultures marry young, and since, in most instances, the payment of a dowry is a necessary preliminary to marriage, parents dread having daughters; women are expected to produce several male children; and they are obliged to live in seclusion according to the pardah system. These factors contribute directly or indirectly to high female mortality: female children are neglected; maternal mortality is high due to high fertility and unskilful midwifery; and finally, as a result of certain social customs, which include the seclusion of women, women are more susceptible than men to infectious diseases such as tuberculosis.

FOOTNOTES

1. Natural and Political Observations (London: J. Martyn, 1676), pp. 64-71.
2. Recherches et considérations sur la population de la France (Paris: Moutard, Imprimeur-Libraire de la Reine, 1778), pp. 207-209.
3. See William Farr, Vital Statistics, ed. N.A.Humphrys (London: Offices of the Sanitary Institute, 1885), p. 145.
4. Sur l'Homme et le dévelopement de ses facultés ou de physique sociale (2 vols, Paris: Bachelier, Imprimeur Libraire, 1835), pp. 155-159.

5. Data on the pre-natal mortality of other mammals are in agreement with the findings on man. Goehlert's research on horses showed that for every 100 females born there were 106 males, while for every 100 females born alive there were only 97 males. These findings show that males manifest inferior resistance to the causes of foetal mortality. Similar conclusions are reached from the observations on rats, cows and pigs. For a summary of these views see A.Ciocco, 'Sex differences in morbidity and mortality', Quarterly Review of Biology, XV (1940), 1, 59-73, at p. 62.
6. Ciocco, Ibid., p. 64. In the Carnegie Institute, on the other hand, among the very young embryos collected, there were more females than males. M. Boldrini, Sulla proporzione dei sessi nei concepimenti e nelle nascite (Università Cattolica del Sacro Cuore: Contributi del Laboratorio di Statistica, Ser Prima, 1930), pp. 213-287.

7. See R.Woodbury, Causal Factors in Infant Mortality (U.S. Dept. of Labour Children's Bureau Publ. no. 142, Washington: Government Printing Office, 1925), p.32. This study which was carried out in eight cities of the United States, 1911-1916, showed that the infant mortality rate for male infants was nearly one-fourth higher than the rate for female infants. The conclusions are that though the difference in mortality at other ages may be explained by differences in occupation and environment, no such

explanation will account for the greater mortality among males in infancy.

8. The mortality data compiled by the United Nations reveals that in almost all countries males have higher mortality than females. The excess of male mortality in most countries appears at every age level, though in some cases women of childbearing ages have higher mortality rates than men in the same age group (U.N., 1953, p. 48). See also D.G. Wiehl, 'Sex differences in mortality in the United States', Milbank Memorial Fund Quarterly, XVI (1938), 2, 145-155. The female mortality rate in the United States for 1921-23, for the age group 25-34, was higher than the corresponding rate for males in the same age group. By 1927-29 the difference, similar to the other ages, had turned to the disadvantage of males, and this disadvantage has increased with the years (p. 149).

9. It should be noted that Stolnitz is referring to the characteristic periods of childbearing, and not to the causal relationship that may exist between fertility and the occurrence of high female mortality. According to the U.N. data, there is no clear evidence concerning a possible general relationship between the level of fertility and the mortality of women in childbearing ages, under given environmental conditions. The life tables for some populations with high fertility show higher death rates for females than males at ages 20-50years (India 1921-31; Japan 1921-25); whereas other countries (Egypt 1936-38; Palestine Muslims 1942-44) have high fertility but not higher female mortality at those ages (U.N., 1953, p. 135). In his study of New York State 1915-34, Dublin has shown that maternal mortality rates were not significantly affected by the declining birth rate. In 1915 the birth rate was 21.7 births per 1000 population, and maternal mortality 5.81 deaths per 1000 total births. By 1934 the birth rate had fallen to 14.1, but maternal mortality had remained more or less constant (Dublin, 1936, p. 115). There is evidence to the contrary, that

high fertility does affect maternal mortality, for the Hutterites (Eaton and Mayer, 1954, pp. 34-35).

10. 'In Europe the girl baby starts with a life expectancy of one to six years greater than her brother and this advantage is normally maintained throughout life. Only in the ages of the heaviest burden of childbearing is the mortality differential favouring females often reversed. In the majority of countries male mortality is higher even at these ages'. D.Kirk, Europe's Population in the Inter-War Years (Geneva: League of Nations, 1946), p. 174.

11. 'Sex ratio at birth', Eugenics Review, XI (1919), 6-16.

12. E. Westermarck, The History of Human Marriage (2nd edn., London: Macmillan and Co., 1894).

13. The expectation of life at birth for males and females for 1921-31 and 1931-41 was 26.9, 26.6; and 32.1, 31.4 years respectively (Davis, 1951). Coale and Hoover gave the following explanation of the observed differential in the life table constructed from the 1951 Census: 'there is a choice between explaining the recorded masculinity of the Indian population by assuming that the subordinate position of women caused their omission from the census, or by assuming that it caused their death in childhood'. They chose the former explanation, although the official life tables accept the latter. They conclude that the truth lay 'somewhere in between' (Coale and Hoover, 1959, p. 351). For

sex-differentials in mortality in India, see Coale and Demney results of e_0^0 of 37.5 and 36.8 years for males and females respectively (United Nations, 1967a, p. 7 ; cf. Visaria, 1969, pp. 110-111). A difference of two years has been observed in the differential for 1961-71 as compared to one year observed in the past (Adlakha and Kirk, 1974, p. 396).

14. In the PGE there was evidence of a higher female than male underenumeration of deaths in West Pakistan (Krotki and Ahmed, 1964).

15. See A.K.M.A.Choudhury, K.M.A.Aziz and W.H.Morley, Demographic Studies in Rural East Pakistan, May 1968-April 69 (Dacca: CRL, 1970), Table 6; F.Yusaf and M.I. Farooquin, Complete Life Tables for Pakistan and Provinces 1962-65 (Karachi: PIDE, 1969), Tables 8 and 9 (BRFM, p. 94).

16. Cf. G. Lenski, Power and Privilege: a theory of social stratification (New York: McGraw Hill Book Co., 1966. Another study by Blumberg et al., showed that nuclear families were more common in hunting and gathering and industrial societies. On the other hand, extended families that lodge power in the male head were most frequent in agrarian economies that relied on the plough. In the latter type peasant women's mobility was restricted, and they were subject to stringent demands. It was also found that economic development and rising status go together. R.L.Blumberg and R.F. Winch, 'Societal complexity and familial complexity: evidence for the curvilinear hypothesis', American Journal of Sociology, LXXVII (1972), 898-920.

17. Westermarck (op. cit. in footnote 12, pp. 463-466) attributes the surplus of males found in the North-West Provinces of India in 1866 to female infanticide; see also K. Pakrashi, 'On female infanticide in India', Bulletin of the Cultural Research Institute, VII (1968), 33-47. Female infanticide is also said to have existed in Taiwan, where there was a preference for male children. Barclay estimated that 2% of female babies were killed in this way. His estimate was based on the assumption that all male births were registered and that the sex ratio of live births was 105. The sex

ratio of registered births was 109 for the first five years of this century. By 1906 it fell to 105/106 and remained constant thereafter. It coincided with strict prohibitions, by Japanese officials in power, against female infanticide. G.W.Barclay, Colonial Development and Population in Taiwan (Princeton: Princeton University Press, 1954), pp. 159-160. For similar examples of female infanticide among the Chinese, see W.Campbell, Formosa under the Dutch: described from contemporary sources (London: Kegan Paul, Trench, Trubner & Co., 1943), p.629; W.James, The Island of Formosa, Past and Present (New York: Macmillian & Co., 1903), p. 646; W.Thompson, 'An experiment in the registration of vital statistics in China', Congrès International de la Population, Proceedings, 1937 (Paris: Hermann & Cie., 1938), p. 63. In other societies, where girls are thought to be less economically productive than boys, female infanticide is common, because parents cannot afford to waste several years nursing a girl. Moni Nag, 'Anthropology and population: problems and perspectives', Population Studies, XXVII (1973), 1, 59-68.

18. J. Karve, 'The Indian woman in 1975', Perspectives Supplement to the Indian Journal of Public Administration (1966), 103-104. Cited by Boserup, 1970, p. 49.

19. K.S. Batanagar, Dikpatura Village Study (Monograph no. 4, Delhi: Census of India, 1961), Part IV, pp. 61-65. Barclay examined 26 cohorts, from Taiwan data, from their first birthday to their tenth year and found that, although in the first year of life males were at a disadvantage, they soon made up for this, so that by age ten, there were more male than female survivors from an equal number of both sex who had entered the second year of life. Barclay, op. cit. in footnote 17. Cf. T. Smith, Population Growth in Malaya (London: Royal Institute of International Affairs, 1952), p.70; Ta Chen, Population in Modern China (Chicago: Chicago University Press, 1946), p. 19; W.C.Robinson, 'Recent mortality trends in Pakistan', in Studies in the Demography of Pakistan, ed. W.C.Robinson (Karachi: PIDE, 1967), pp. 1-50, at p. 11.

20. 'The dai is an illiterate and an extremely ignorant woman, drawn from one of the most under-priveleged castes of Indian society. She is divorced from any knowledge of basic and elementary rules of health, not to speak of any understanding of the rudiments of midwifery or gynaecology. Want of knowledge is one thing, but with the dai it is a world of rank superstition and old wives'tales. Her assistance in normal deliveries is bad enough but in abnormal cases the result is, more often than not, painful death'. S.Chandrasekaran, Infant Mortality in India 1901-55 (London: Allen & Unwin Ltd., 1959), p. 129. See also J.E.Gordon, H.Gideon and J.B.Wyon, 'Childbirth in rural Punjab, India', American Journal of Medical Science, CCXLVII (1964), 344-362; H.Gideon, 'A baby is born in the Punjab', American Anthropology,LXIV (1962),1220-1234; J.E. Gideon and Wyon, 'Midwifery practices in rural Punjab, India', American Journal of Obstetrics and Gynaecology, XCIII (1965), 734-742.

21. S.Chandrasekaran, Planned Parenthood (London: George Allen & Unwin Ltd., 1955), p. 21. In a study carried out between 1929-31 in a sample of the population of North and South China it was found that the main reason for the lower female expectation of life at birth relative to males (e_o^o females 34.63 years; e_o^o males 34.85 years) was the higher female mortality at the reproductive ages. F.W.Notestein, 'A demographic study of 38256 families in China', Congrès International de la Population, Proceedings (Paris: Hermann & Cie., 1938), pp. 32-55.

22. The decline in female death rates in the United States has led to an increase in mortality sex-differentials to the disadvantage of males. In 1950 it was observed to be 50% higher for males at the ages 15-74. It is believed that something other than basic biological differences between the sexes accounts for the more rapid decline in death rates for women than in the death rates for men. See T.Sowder, 'Why is the sex difference in mortality increasing?', Public Health Reports, LXIX (1954), 9, 860-864, at p. 861.

23. More males than females die of tuberculosis in the United States. The excess of male deaths is found particularly at the later ages. The death rate for females is only higher between the ages of 10-30. L.I.Dublin et al., The Facts of Life: from birth to death (New York: Macmillian Co., 1951), p. 119. See also W.H.Frost, 'The age selection of mortality from tuberculosis in successive ages', American Journal of Hygiene, XXX (1939), 3, 91-96. [Reprinted in The Milbank Memorial Fund Quarterly, XVIII (1940), 1, 61-66.]

24. A.C.Ukil, 'Tuberculosis in India', Proceedings of the Fourth International Congress on Tropical Medicine

and Malaria, II, p. 1509. Cited by Davis, 1951, p.56.

25. R.A.Riste, _Indian Medical Gazette_, LXXIII (1938), p. 551; _cf_. P.V. Benjamin, _Ibid_., p. 540. Both cited by J.B.McDougall, _Tuberculosis: a global study in social pathology_ (Baltimore: The Williams and Wilkins Co., 1949), p. 68.

26 K.K.Mathen and P.Sinha, 'Relative health of women in Indian cities', _Indian Medical Gazette_, LXXXVIII (1953), 309-313.

CHAPTER 3

BACKGROUND TO STUDY AREA

3.1 INTRODUCTION

This chapter outlines the ecology and ethnology of the study area, the social and economic structure of the community, the religious and customary rituals associated with the life cycle and disease, and education and regional development programmes in the area. The purpose of this chapter is threefold. Firstly, in accordance with convention, it attempts to describe the area where the census was conducted; secondly, it underlines the rules, be they tribal/social, economic or religious, which govern the position of the individual in this particular society, with special reference to women; and finally, it seeks to throw light on the methodology of fieldwork and the quality of the data discussed in subsequent chapters by placing them within the context of this society. The sources of the data for this chapter are descriptive and observational material collected in the field; socio-economic questions included in the questionnaire; Settlement Reports, Village Pedigree Registers, Gazetteers and secondary information.

3.2 ECOLOGY AND ETHNIC BACKGROUND

The North West Frontier Province of Pakistan[1] lies between latitudes 30-36N. It has a total of 39,259 square miles. Its greatest length is 409 miles and greatest breadth 279 miles. The Province lies, almost entirely,[2] between the Indus river and the Durand line.[3] The name is derived from its geographical

MAP OF THE INDIAN SUBCONTINENT

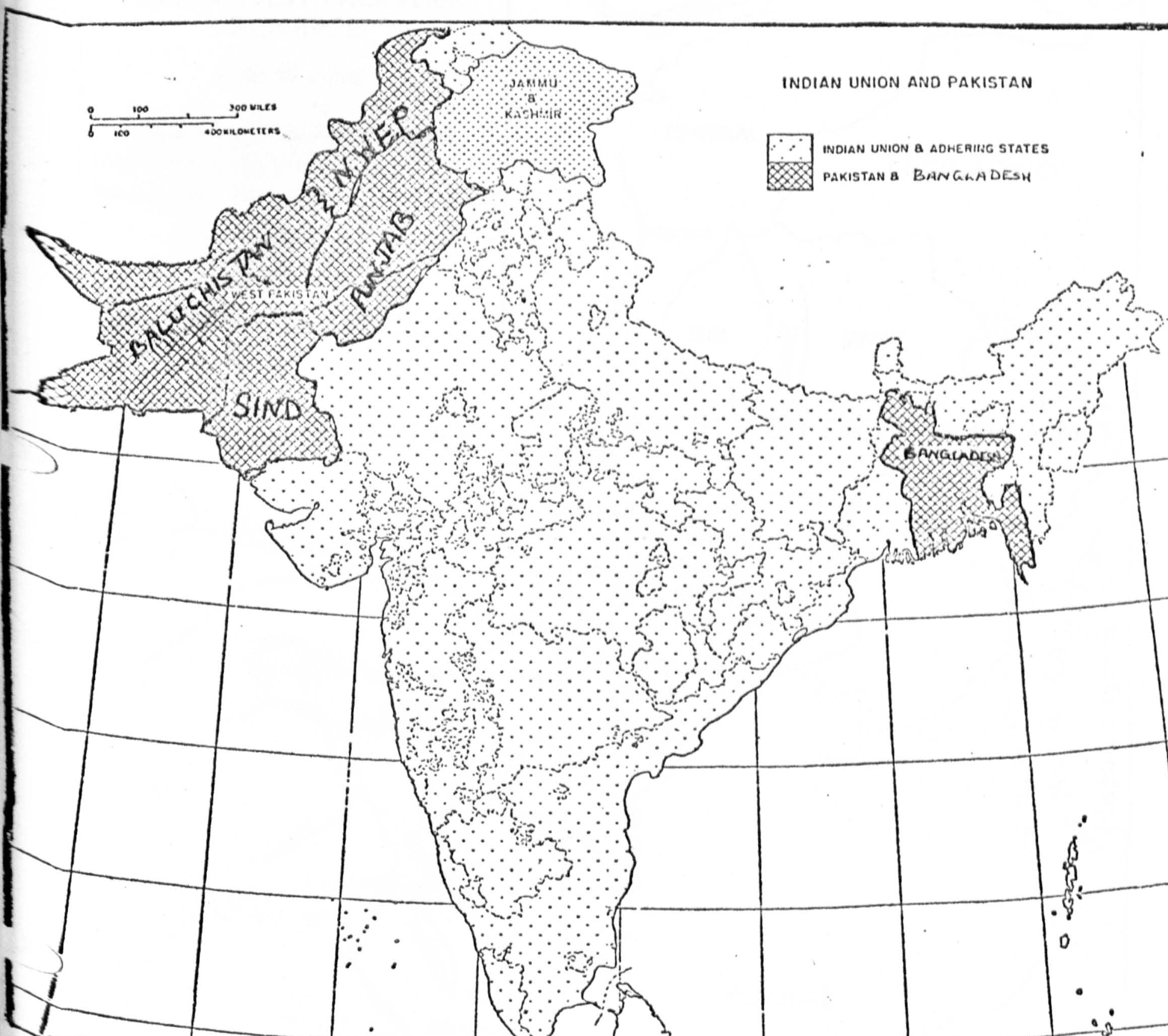


FIGURE 1. MAP OF THE INDIAN SUBCONTINENT

FIGURE 2. MAP OF THE NORTH WEST FRONTIER PROVINCE OF PAKISTAN

position on the Indian Subcontinent under British rule. It is divided into six districts, known as the settled areas,[4] and also includes a tribal area[5] which stretches more than four hundred miles from north to south against the Durand line.

Geographically the study area lies in the Peshawar valley. It is surrounded on all sides by hills except to the east. Through its centre flows the Kabul river which has its source in Afghanistan. On entering the plain of Peshawar, the river divides into two main branches, the Adezai to the north and the Naguman to the south. After following separate courses for twenty miles, they rejoin, the northern branch having been enriched by the Swat river. The joint Kabul and Swat rivers flow into the Indus at Attock.

The scanty rainfall of 13.5 inches occurs mainly in the autumn and winter months. Autumn, winter and spring, which are from October to June are relatively mild and humid. The summer months of July to September are hot and dry. Temperatures sometimes reach 120 degrees Fahrenheit. The flora and fauna are of both the temperate and tropical climates (NWFP, 1931, pp. 1-33; Pakistan, 1951, p. 1).

The indigenous occupants of the area are of diverse ethnic origin, but they can be divided into two main groups: the Afghans[6] and the non-Afghans. The former group is of Afghan origin and is known as Pushtun, Pukhtun or Pathan. They speak Pushtu and are Sunni Muslims.

The Pathans are divided into several different tribes called <u>kaum</u> or race. These bear the adjunct <u>zai</u> or son after the proper name of each, i.e. the tribe of Yusufzai or son of Joseph. Each tribe occupies a major region in the Province from which the name of the region is derived.

The tribes in their turn are divided into <u>khels</u> or clans, and each clan is composed of <u>kors</u> or families, of varying sizes.[7] Some clans are larger than tribes and have lost all connection with the parent group (Spain, 1975, p. 23).

The Pathans trace their descent to Kais/ Qais[8] or Abdur Rashid, a tribal chieftain in the seventh century A.D., whom they claim was the thirty-fifth lineal descendant of Afghana, son of Jeremiah, son of Saul, the first king of Israel. The descendants of Afghana were said to have been carried away into captivity from Syria by Nebuchadnezzar and planted in different parts of Persia and Media. From these positions they later emigrated eastward to the country of Ghor, and were known as Bani Afghan and Bani Israel.[9] It is believed that they were converted to Islam by some members of their tribe who had fought for the Prophet Muhammad under their leader Kais, and that the Prophet, pleased with the services of Kais, had given him the name of Pathan, the Syrian word for rudder. Support for the idea of Semitic descent has been found in the Pathan code of honour,[10] their Semitic features and customs,[11] and their biblical names.[12]

The claim to Semitic ancestry was discredited more than a hundred years ago,[13] and the Pathans have been identified as the 'Paktuike' mentioned by the Greek historian Herodotus as 'the most warlike of the Indians'. It is now generally accepted that the tribes inhabiting this region in the time of the ancient Greeks were the Aryans who had moved down from Central Asia a millennium earlier. Their blood was subsequently intermingled with that of other invaders who came to India from the same area.

In the third and second centuries B.C. the Mauryan dynasty absorbed the remains of the Greek civilization established on the Frontier by Alexander and his successors, and this process gave rise to the Graeco-Buddhist civilization of Ghandara. For the next thousand years the Central Asian tribes, the Parthians, the Sakas, the Yeuh-Chi, the Kushans and the white Huns, came to the area. Towards the end of the tenth century A.D. the Frontier tribes were converted to Islam and joined the armies of Mahmud of Ghazni, the 'Idol breaker', in his invasions into India. When the founder of the Moghul empire in India, Babur, the descendant of Ghenghis Khan and Timur (Tamerlane), launched his first invasion in the Subcontinent in 1505, the divisions among the tribes had already been established and they occupied the area in which they are found today. For the next two hundred years the Pathans fought the Moghuls, and in 1761, a Pathan army under Ahmad Shah Abdali defeated the Mahrattas who had succeeded the Moghuls and cleared the way for British conquest. After this the Pathans fought both the Sikhs and the British. The Sikhs under Ranjit Singh captured Peshawar in 1823, and the British did not leave until 1947, the end of British rule in India (Bellew, 1879; Crooke, 1896; Murray, 1899; NWFP, 1931; Caroe, 1956; Swinson, 1967; Spain, 1975).

3.3 THE STUDY AREA

Daudzai *thana* is in Peshawar *tehsil* of Peshawar district.[14] It includes 89 villages and 46 hamlets. The total area comprises 51,690 acres or approximately 79.5 square miles. In the 22 study villages there were 2,070 households. The average family size was 6.7 persons per household with a density of approximately 1,210 ~~thousand~~ persons per square mile. The total population of these villages was 14,062 persons, of which 7,314 were males and 6,748 females, that is to say a sex ratio of 1084 males to a


MAP OF DAUDZAI THANA
REFERENCE
1. BOUNDARY LINE.
2. U.C. BOUNDARY
3. UNION COUNCIL.
4. VILLAGES
5. ROAD P.W.D
6. DISTT COUNCIL ROAD
7. RIVER
N
MICHNI
MICHNI FORT
RIVER KABUL
NAGUMAN RIVER
ADEZAI OR HAJIZAI RIVER
ADEZAI RIVER
SHAH ALAM RIVER
SARDARYAB RIVER
KHIALI RIVER
CHARSADDA ROAD
SHABQADAR ROAD
JOGGANI
TAKHAT ABAD
NAHAQI
KHAZANA
PAJAGGI
MATHRA
GUL BELA
MIAN GUJJAR
BUDNI
OKHANDAI
PESHAWAR

MAP OF STUDY VILLAGES IN DAUDZAI THANA AND MICHNI

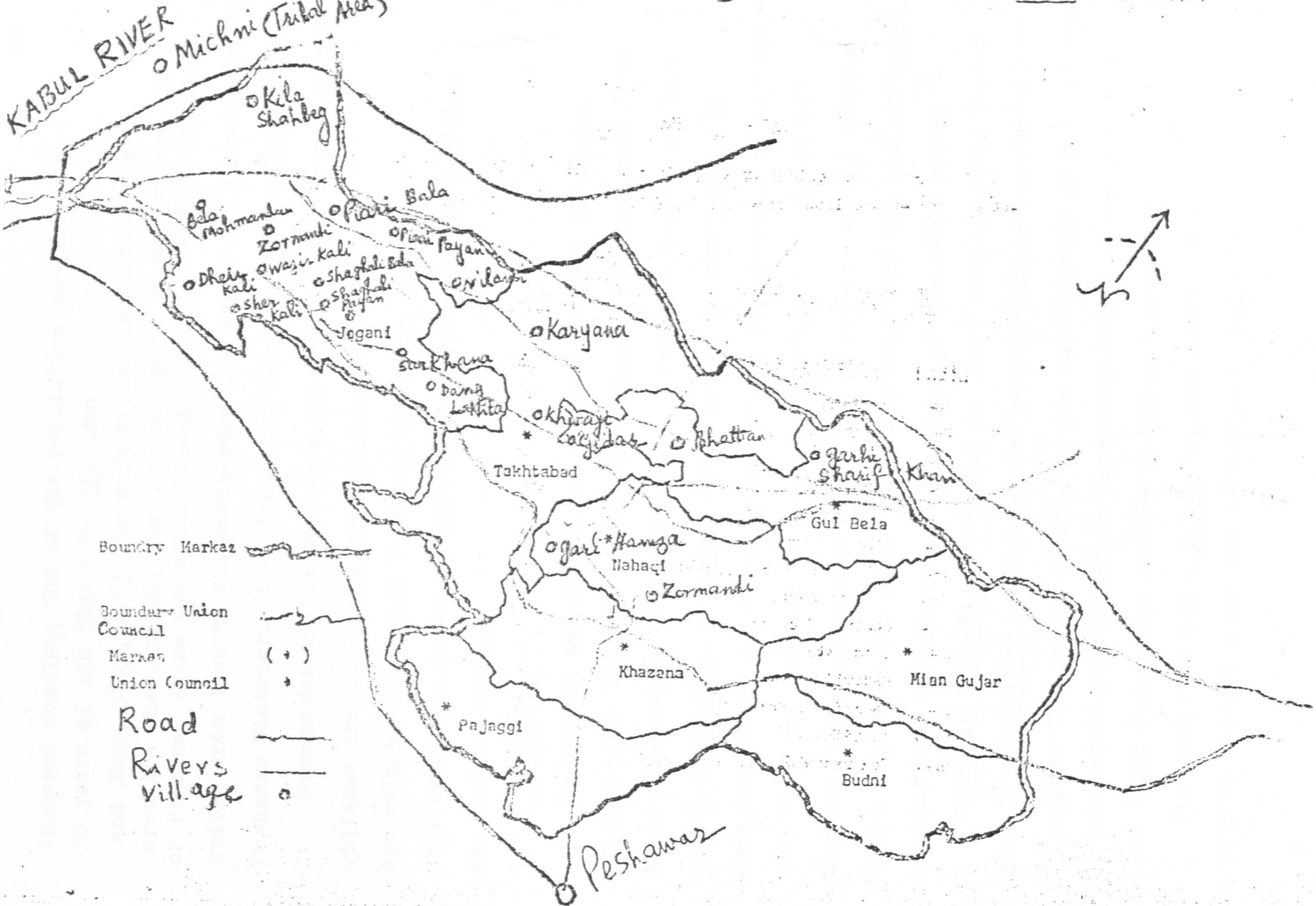


FIGURE 3b. MAP OF STUDY VILLAGES IN DAUDZAI THANA AND MICHNI

thousand females; 70% of the population was under 30 years of age Figs 4-6; cf. Khan and Shah, 1973, p.1). The main tribes inhabiting the area are the Daudzai, the Mohmands and a miscellaneous class of Pathans, Awans and other Hindkis[15] (Figs 7-9). Michni tribal area lies to the north-west of Daudzai and is attached to Peshawar District. It is inhabited mainly by the Mohmand tribe.

Communications in this area are bad. A large number of the villages are surrounded by rivers on all sides and can only be approached by ferry boat. The dirt roads that exist are in bad repair. In most villages field ridges are used as paths.

3.3.1 Villages

In Daudzai and Michni the division of land forming a village site was carried out according to the same principle as in other parts of the Frontier. A separate quarter or ward called a muhalla or kandi was allotted to every khel or clan, and within a clan to every section or sub-section, so that each ward was composed of separate households of individual families. Some villages are composed of several wards, whereas others only have one ward.[16] Formerly each ward had its own malik or chief, subordinate to the chief of the whole tribe.[17]

There is a jumāt or mosque in every ward which is looked after by the mullah or priest. He is responsible for its upkeep and repair. The mosque is used by the male members of the village for congregational and other ceremonial prayers, and also as a place where young boys receive religious instruction.

The ward also has a hujra or guesthouse. This consists of a room or several rooms and a courtyard. It usually belongs to the chief or lambardar, the village headman. The hujra is an important Pathan institution. It is used to entertain male guests; as a meeting place for the male members of the ward; and as a dormitory for the bachelors of the village, since it is customary, especially among tribal Pathans, for bachelors to sleep outside the home after reaching manhood. Both the mosque and the guesthouse are usually situated on the outskirts of the village so that they are readily accessible to visitors.

Some villages also have bandas or hamlets which form part of the village. They were initially established when there was encroachment of one clan on the lands of another. They are generally inhabited by members of a poorer tribe or by the tenant classes (NWFP, 1884, pp. 82-83; Ridgway, 1910, p. 22; NWFP, 1883).

3.3.2 Habitations

Each kandar or dwelling consists of a kor or house and a walled enclosure, a golai or courtyard. There are two types of dwellings: pukka and kucha. The former type of dwelling is made of cement; the house usually has several rooms that open on to a courtyard; and there is generally a private well in the courtyard. This type of dwelling belongs to the wealthier landowners and few of such dwellings were found in the study area; only 0.2% of the houses were made of cement (Fig. 8). The second type is common among small cultivators. These dwellings are constructed of mud, plastered with clay mixed with straw. They are about 10 ft. high. The roof has wooden beams supported by pillars; dry branches and dry grass are placed over the beams and covered with clay and mud plaster. The courtyard has a shed for livestock, such as cattle, goats and sheep. In dwellings with only two rooms, one is generally used in winter to house the cattle. In the study villages few houses had more than two rooms: 43.9% of households had one room; 32.9% had two rooms; and 23.2% had three or more rooms (Fig. 9).

The main contents of the house were string beds, an average of six per family, tanrai or a wooden chest for clothes, some earthenware dishes, and, very often, a zongo or cot. Modern objects, such as bicycles, radios etc., were owned by 55.1% of households (Fig. 10; NWFP, 1884, p. 84). Of all families 82% owned their own house (Fig. 11). The land area of 73.1% of the houses was up to 1 kanal, that of 18.6% was 2 kanals, and that of 8.3% was more than 2 kanals (8 kanals= 1 acre; Fig. 12). Only 27.6% of families had their own well. Most families stated that they fetched their water from the river or from a private well belonging to the village headman or the mosque (Fig. 13; NWFP, 1884, p. 84; field notes).

3.4 SOCIAL STRUCTURE

The individual is a member of an elementary or a joint family (kor); the family in its turn belongs to a tribe (kaum) and a clan (khel). The individual is also a member of a community, the village brotherhood (braderie), with whom he shares a settlement site.

3.4.1 Family structure

Each house is occupied by an elementary or a joint family which maintains itself as an independent economic unit. The members of the family work together and cook jointly. The families are patrilineal and patrilocal.

A. Composition of the elementary and joint family

Of all families in the area 65.4% were elementary families, consisting of married couples and their unmarried children; 25.0% were joint families composed of the spouses of the head, their unmarried children and married sons, daughter-in-laws, and widowed parents, usually widowed mothers; 9.6% were extended joint families of unmarried or married siblings with their spouses and children living together (Fig. 14).

B. Functions of the members of the household

Head: In Pathan society the senior male member holds total authority over all the members who form part of his household. He represents the household in all its dealings with the outside, especially in the negotiations and arrangements connected with ceremonial occasions. His main functions, however, are related to his employment. In the case of agriculture this includes: ploughing, sowing, weeding and harvesting.

Wife of the head: Women exercise relative power within the household in connection with their control of domestic duties. These include: preparation of food, grinding corn, fetching water, washing vessels and clothes, cleaning the house and bedding, sewing, and plastering the house twice a year. Their role in agriculture is subordinate and limited to the care of domestic animals, and sometimes weeding, cleaning the maize crop and carrying sugar-cane to the village *ghur ghani* or cane crusher.[18]

Children: Children help in the household duties from an early age. A girl's work begins when she is six or seven years old: she assists in the house, caring for younger children and fetching fodder for the cattle. Boys also help to tend cattle, but nowadays most of them attend school and their participation in agricultural work begins later.

Daughter-in-law: The daughter-in-law, like the junior wife, holds the lowest position in the household. All the heavy domestic duties are her responsibility. She takes her instructions directly from her mother-in-law. Her relations with all the male family members are formal, and this, at least in public, includes her own husband.[19] She is only accepted as a full member of the family once she has given birth to a male child. The position of the daughter-in-law has improved with an increase in the age at marriage and the slow disappearance of the old joint family system.[20]

Widowed parent: In most cases the widowed mother lives with her eldest son. Her work usually involves looking after the children and helping in the minor household chores. In theory she represents an important member of the household, but in practice her position is insecure.

C. The pardah system

Pardah in the village: There is no pardah in the village in the strict sense of the word, because women do not veil their faces as they do in the urban areas, nor are they totally confined to the house.[21] Women only cover their faces with a burqa or chadar, veil or sheet, when they leave the village or when they encounter a stranger. But there is strict segregation of the sexes among adults in the village and in the family.

Pardah in the family: Within the family segregation is marked by a formal relationship between members of the opposite sex at all times.

Men and women eat separately. Women usually take their meals after the men have been served. Furthermore men avoid mentioning the names of mature female relatives in public. Married women themselves will not mention their own name in the presence of a member of the opposite sex and usually give the name of their eldest son. (Meer, 1882; Jones, 1941, pp. 211-219; Honigmann, 1957, pp. 154-173; Ibid., 1958, pp. 47-48; field notes).

3.4.2 Class in the village community

The population in the villages is divided according to kaum or tribe, and membership is determined by birth. Three major classes[22] can be distinguished: the saintly class; the Pathans or the landowning tribesmen; and the menial or occupational classes.

A. The Saintly class

The Pathans believe that certain groups of people are superior because of their religious descent. They are collectively called aztanadar or 'place possessor'. They are people whose ancestors in the past acquired the title of zburg or saint, by virtue of their piety and the miracles they performed during their lifetime.

Among the Pathans there are four types of astanadar: the Sayyids, who occupy a position of great social respect and are the direct descendants of the Prophet; the pīrs, who are descendants of Pathans whose ancestors became recognized as saints during their life or after their death; the mīans, who are descendants of saints, whose ancestors were not Pathan, but hamsayas or dependants; and finally the *sahibzadas*, whose ancestors were of a lower grade of sanctity.

In view of their position in society their hereditary share in the land is rent free. They are exempt from labour and taxes of every kind, and they receive a regular share of the produce of the fields and animals from the villagers, in addition to alms and other offerings (NWFP, 1884, pp. 118-119).

B. Pathan landowners

The village landowners are composed of the *khans*, the *arbabs*, the *maliks* and the *daftaris*. The *khans* and *arbabs* were formerly the collectors of the tax revenue; they therefore held positions of power in the village community. They are large landowners, and most of them do not cultivate their own land. There were very few *khans* and no *arbabs* in the study area. Next in importance are the *maliks* or clan chiefs. All the other proprietors are called *daftari* or the holders of ancestoral shares in the land by virtue of their patrilineal descent from the founder of the clan (*Ibid.*, p. 126).

C. Occupational castes

The *hamsayas* or dependants form the third class. The origin of this class derives from the Pathan custom of granting asylum to strangers who are not members of the tribe. According to this custom, families of traders, menials and other dependants of foreign extraction are protected by the Pathan tribe with whom they have settled; yet they retain the status of clients and are debarred from membership of the tribe. Therefore a blacksmith, when asked the name of his clan, will state the name of the Pathan clan with whom he has settled, but his class or caste will remain lohār or blacksmith (Crooke, 1896, p. 158; Rose, 1919, p. 221).

Among the occupational castes or classes are: priests,[23] shopkeepers, muleteers, farmers,[24] goldsmiths, tailors, carpenters, blacksmiths, potters, herdsmen, ferrymen, musicians, barbers, washermen, and thong and sieve makers (NWFP, 1884 , p.117).[25]

3.4.3 Organization of the village

The organization of the village can be divided into the social or tribal organization, and the administrative or government organization.

A. Social organization

The social organization of the village is represented by the jirga or village council. It consists of the lambardar or village headman and other village mashran or elders. The functions of the village council in the settled areas comprises: decisions directly relevant to the community, i.e. construction of a mosque or repair of a dam; petitions to be made to the government through the village headman, i.e. demand for link roads, arrangement for protection against calamities such as floods, or land development works such as irrigation; and the settlement of disputes between two families, usually connected with land or water rights. The council in the tribal territory also tries criminal cases. There is seldom any voting. 'The sense of the meeting is usually quite apparent', and once the council has come to a decision, its word is final and is rarely unheeded especially in the tribal areas (Spain, 1957, p. 141).

B. Government organization

The government is represented in the villages of the settled area by the lambardar or village headman and the tchowkidar or village watchman. The former collects the land and water taxes from the villagers on a commission basis. He also serves as a contactman for all government officials in their duties connected with his village. The tchowkidar is usually a member of the tenant class. His main duties are to report births and deaths; to make periodic reports to the police station; and to assist government officials on their visit to the village. Both the offices of headman and watchman are hereditary (Vreeland, 1957, pp. 131-132). The third representative is the patwari or revenue and land records clerk. He calculates the revenue tax to be collected and assessed by the village headman and also registers inheritance proceedings and sales of land. He is not a resident of the village but makes periodic visits in connection with his duties (Honigmann, 1958, pp. 7 and 53).

The settled area together with the tribal area of the study are under the responsibility of the district commissioner of Peshawar (Spain, 1957, p. 136).

3.5 ECONOMIC STRUCTURE

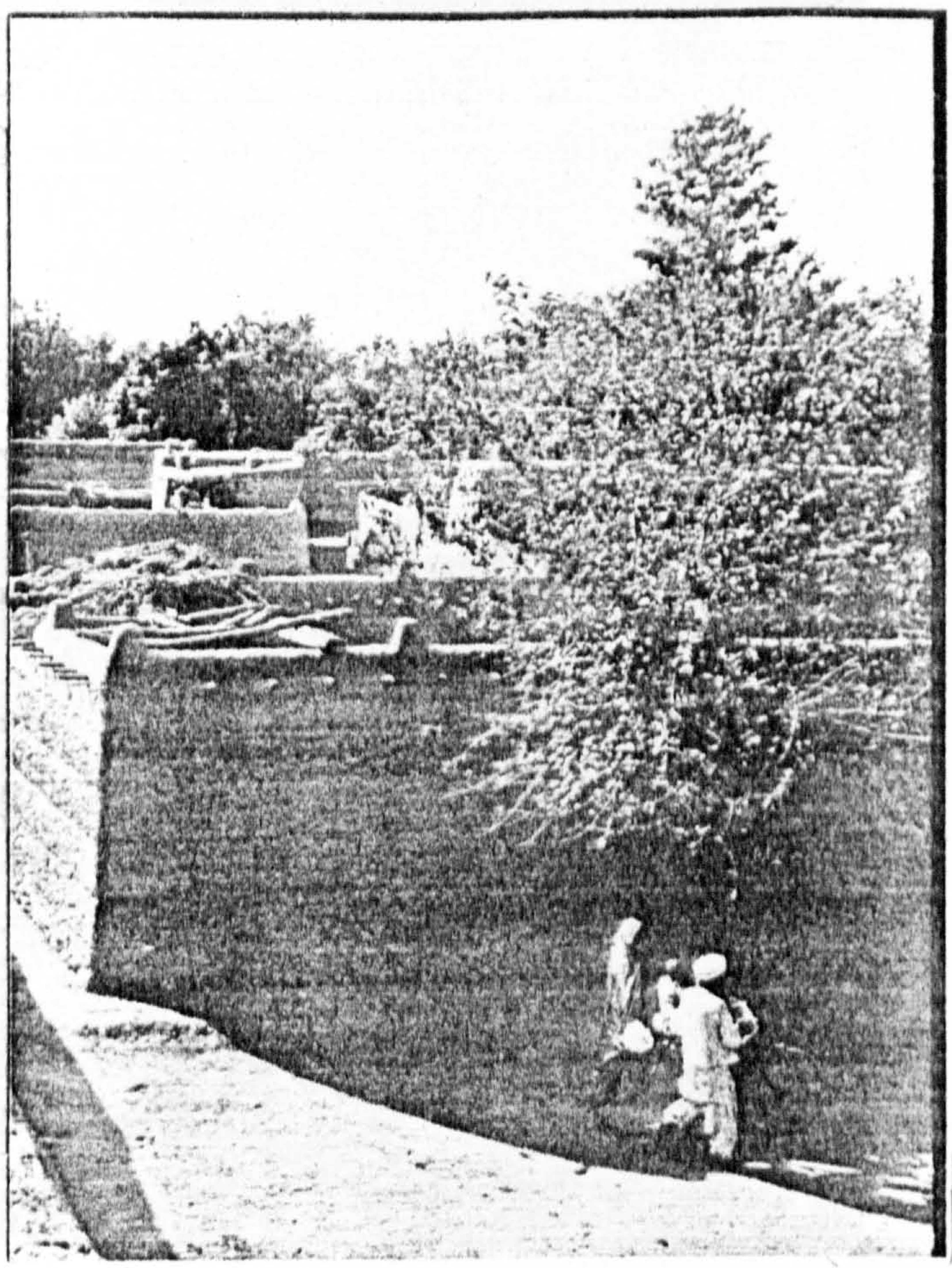
The villages of Daudzai and Michni are agricultural communities and land is considered the most important asset. In the study area 82.9% of the households were employed in agriculture (Figs 15a, 15b).

3.5.1 Division of land

The division and distribution of agricultural land among the Pathans was carried out in the same manner as the division of land forming a village site. The common land held by the tribe was originally divided into lots called daftar or hereditary possessions, and these were subdivided into family lots called bakhra or equal shares.[26] This gave each tribe or clan a fixed possession in the soil. However, since the plots that were distributed were not of equal quality, i.e. in terms of water supply or accessibility, there was a periodic vesh or redistribution, ensuring a constant rotation of ownership. This phenomenon was once widespread, but has now been discontinued in most places and does not exist in the study area. Sometimes, as a result of aggression, a tribe could lose its lands and villages to another tribe and thereby forfeit its hereditary shares in the land.[27]

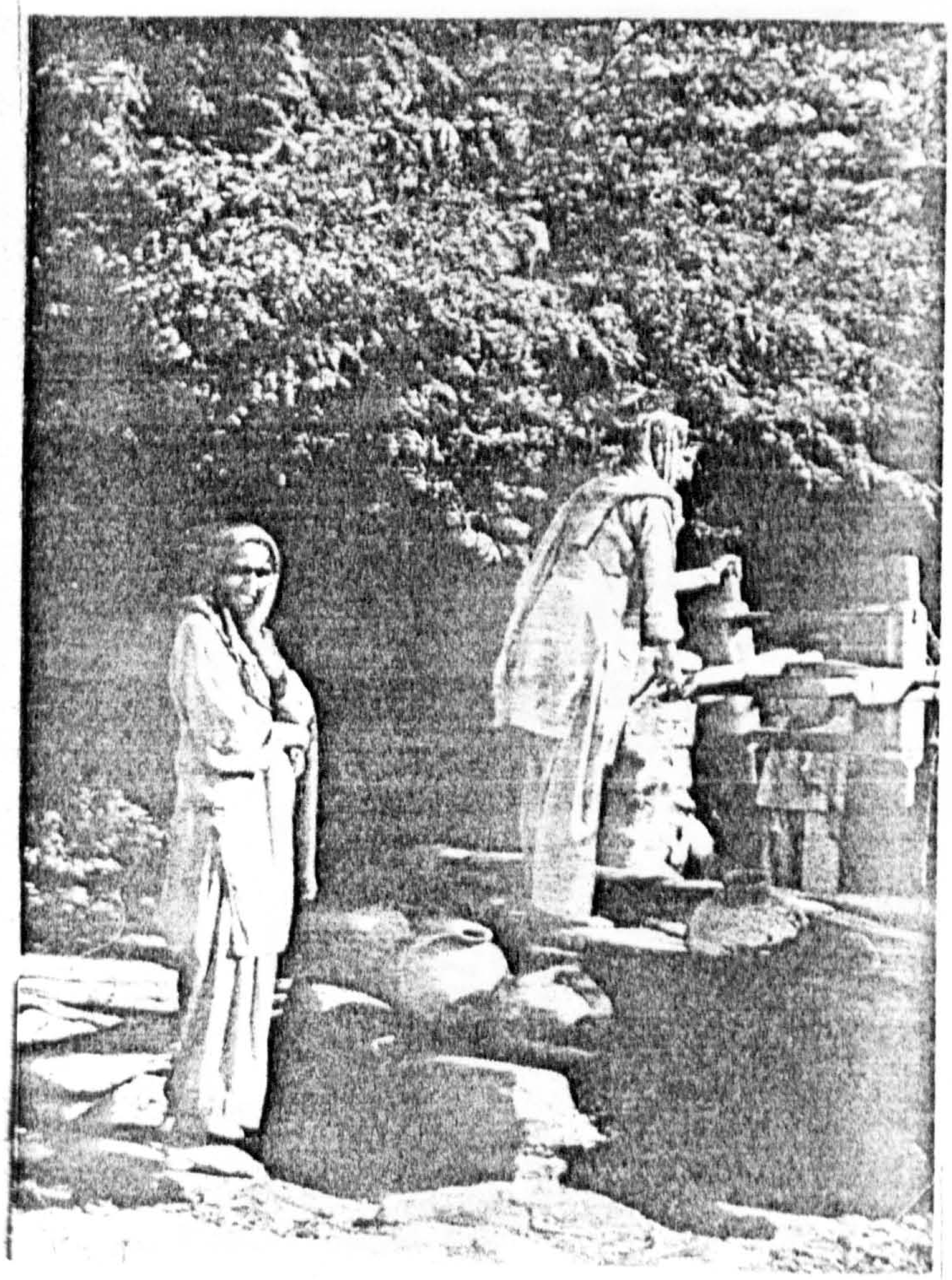
When the head of the household dies his successors inherit equal shares or bakhra of the land that was owned by him. The equal shares are later divided into equal plots. All sons receive an equal share of the inheritance; despite the Quranic law stipulating that the share of two females is equal to that of one male, females are excluded from inheritance in Pathan society.

A VILLAGE IN DAUDZAI



A view of houses

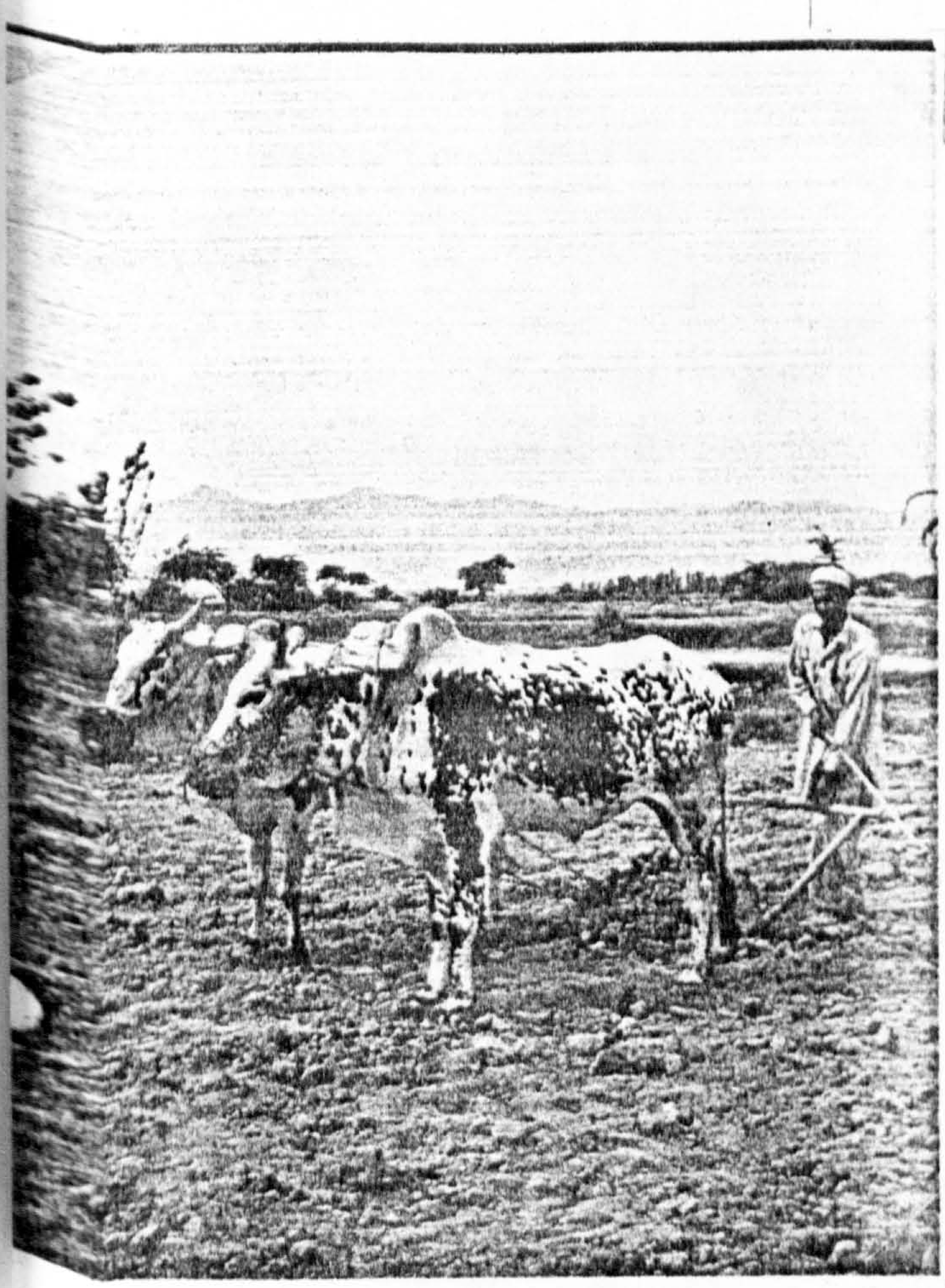
A courtyard



A village well

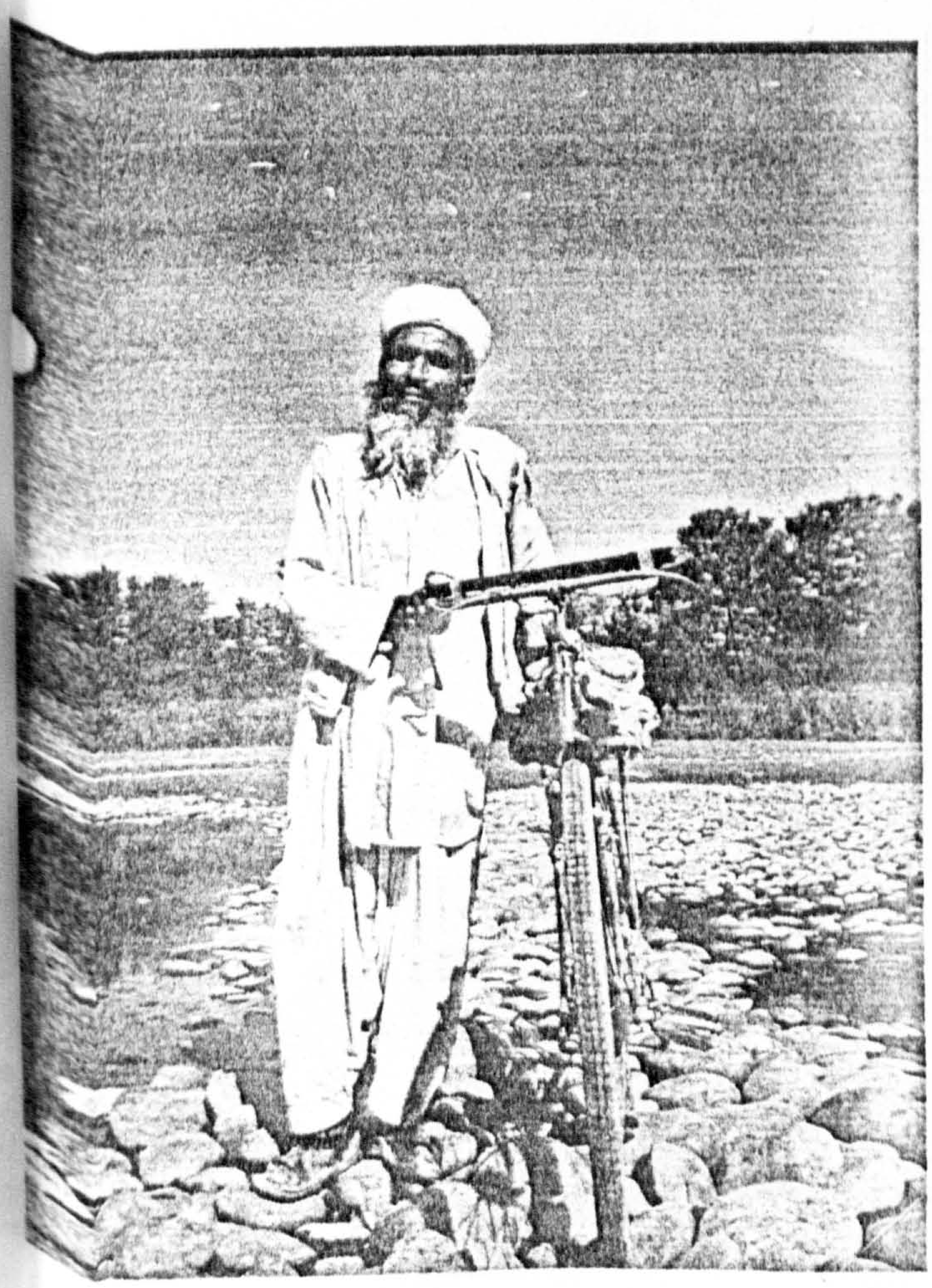
A village graveyard

MEN AT WORK



A man ploughing

A carpenter



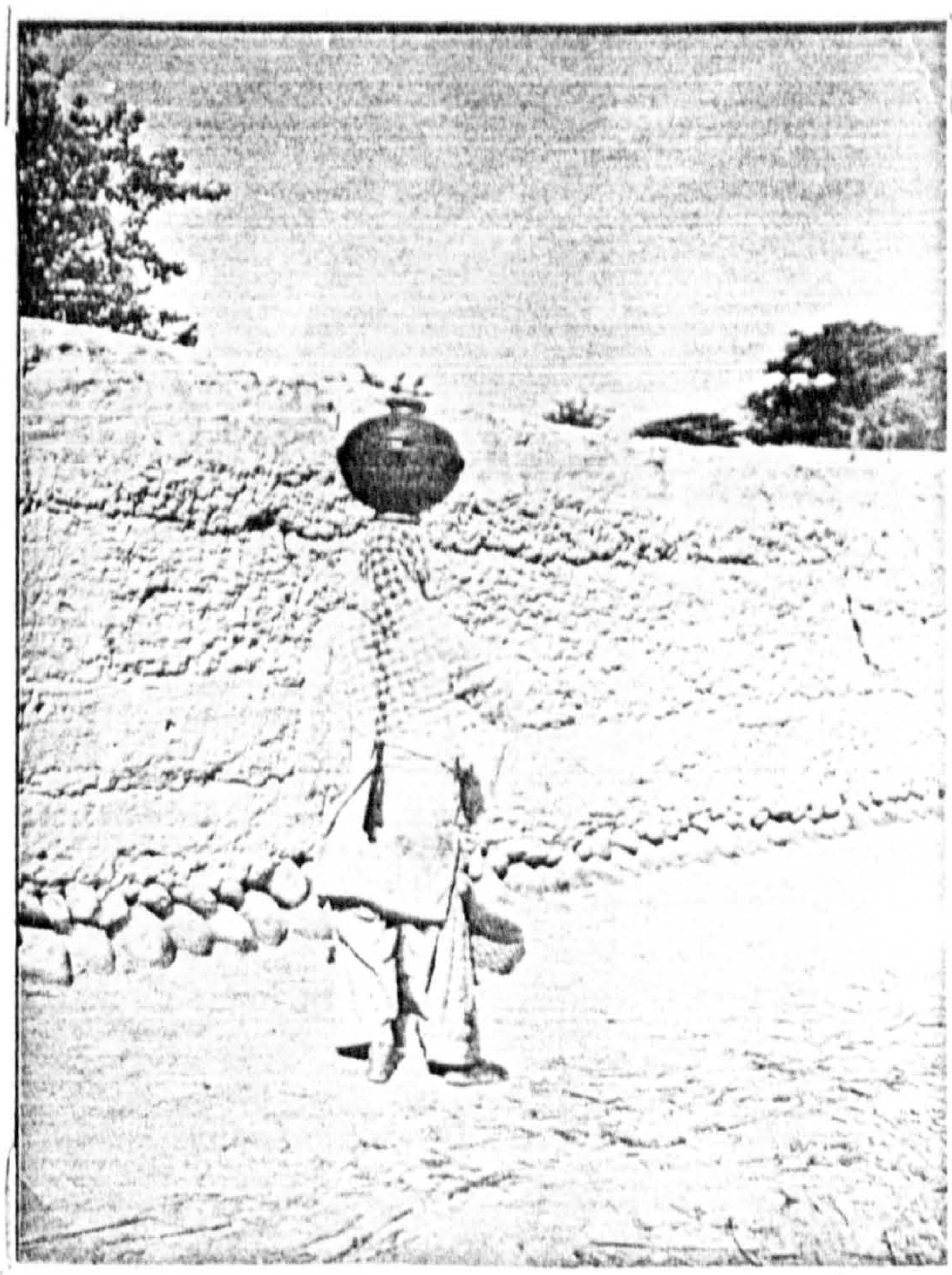
A mullah

A man and a water buffalo

A woman plastering a wall

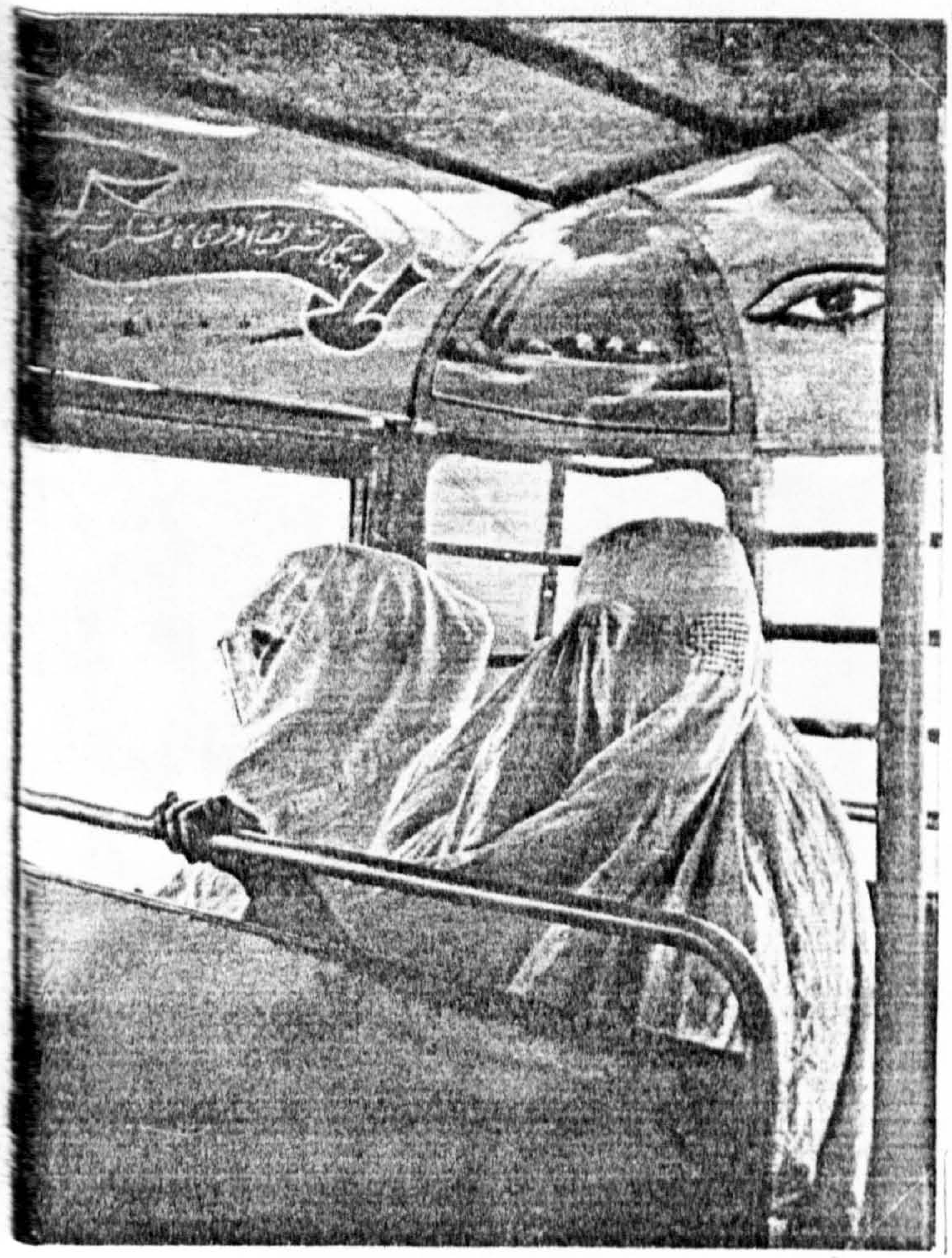
Two women cooking

A woman making bread ir
or clay oven.

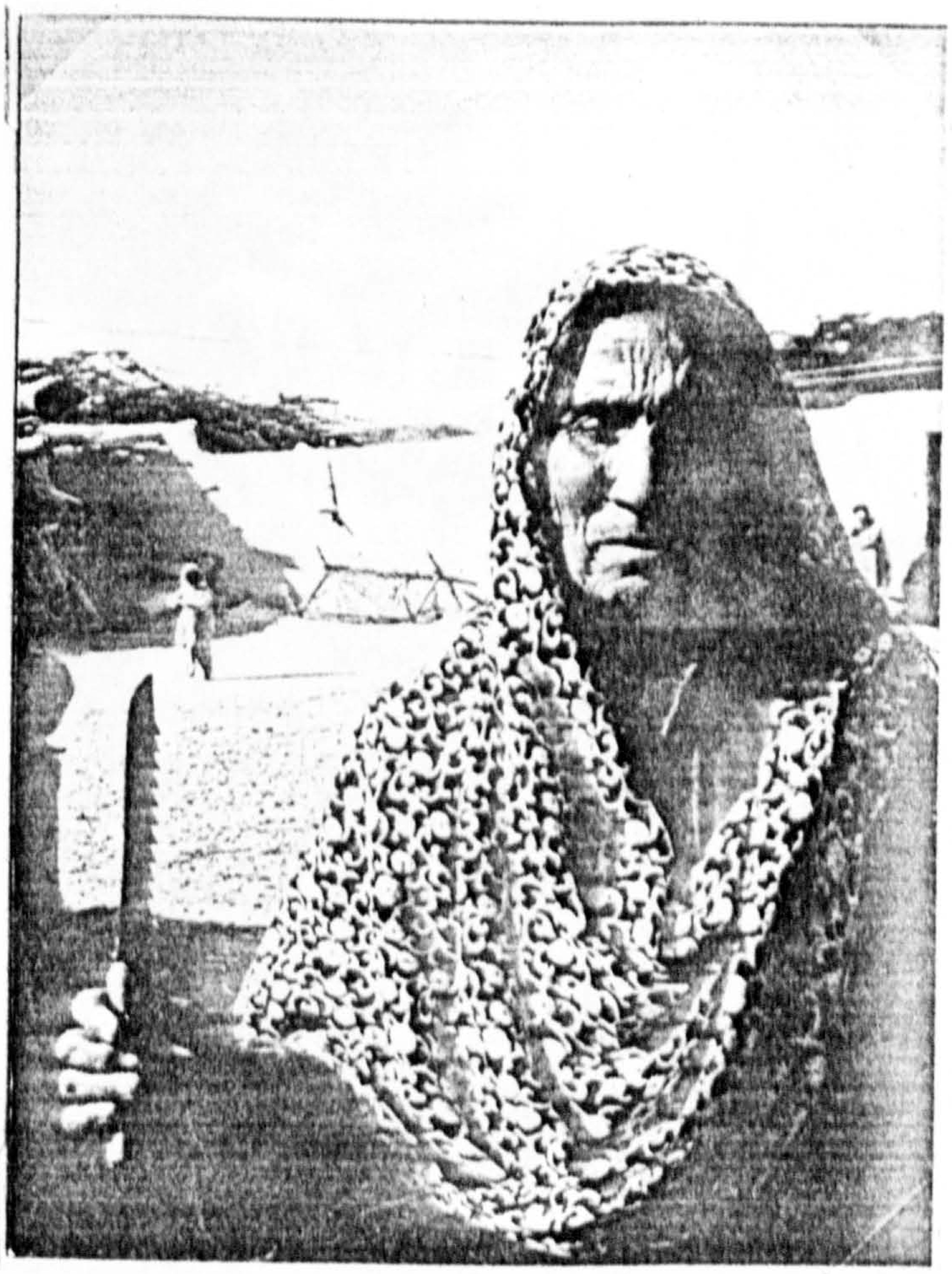


A woman carrying a jar of water

PORTRAITS OF WOMEN



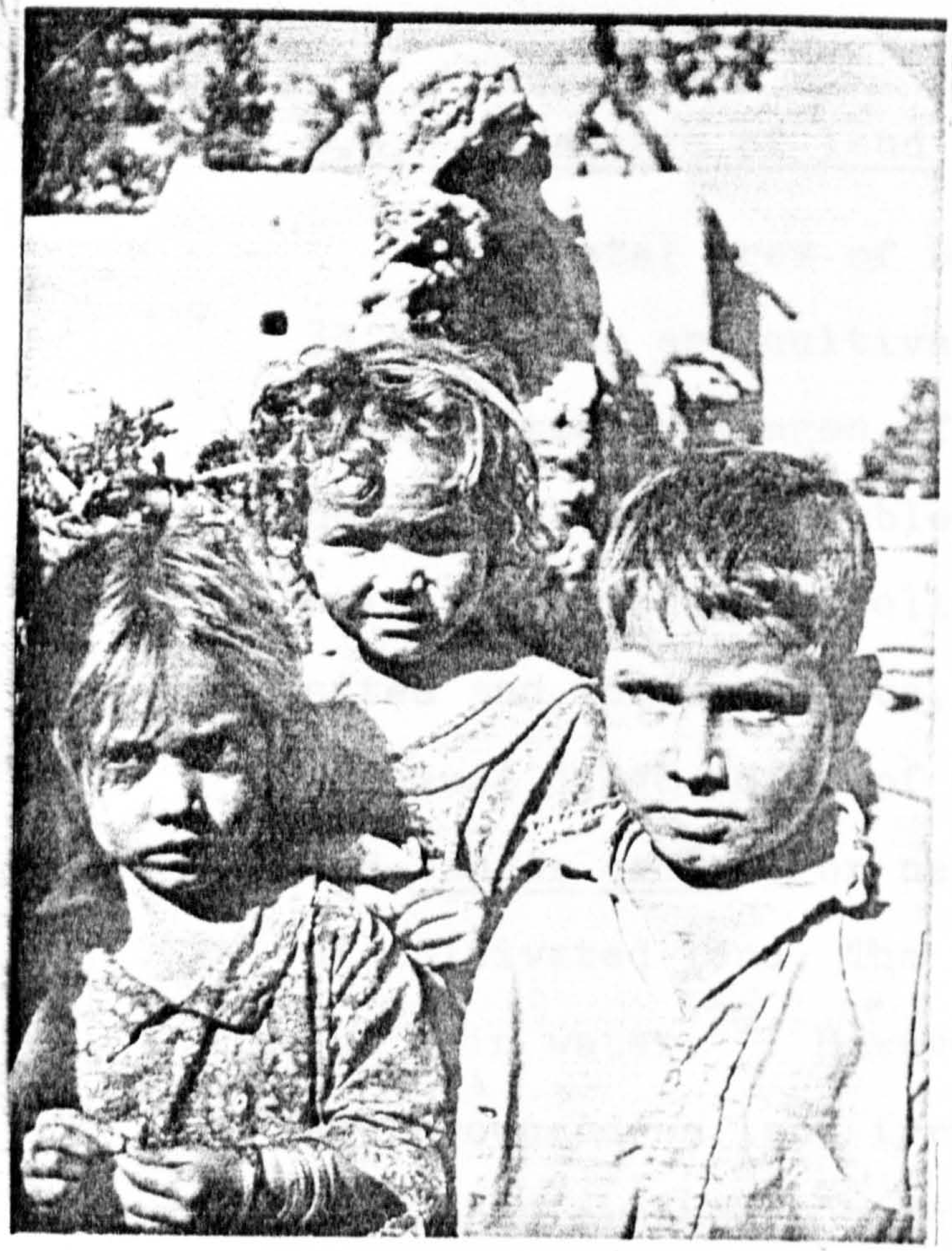
Two veiled women in a bus



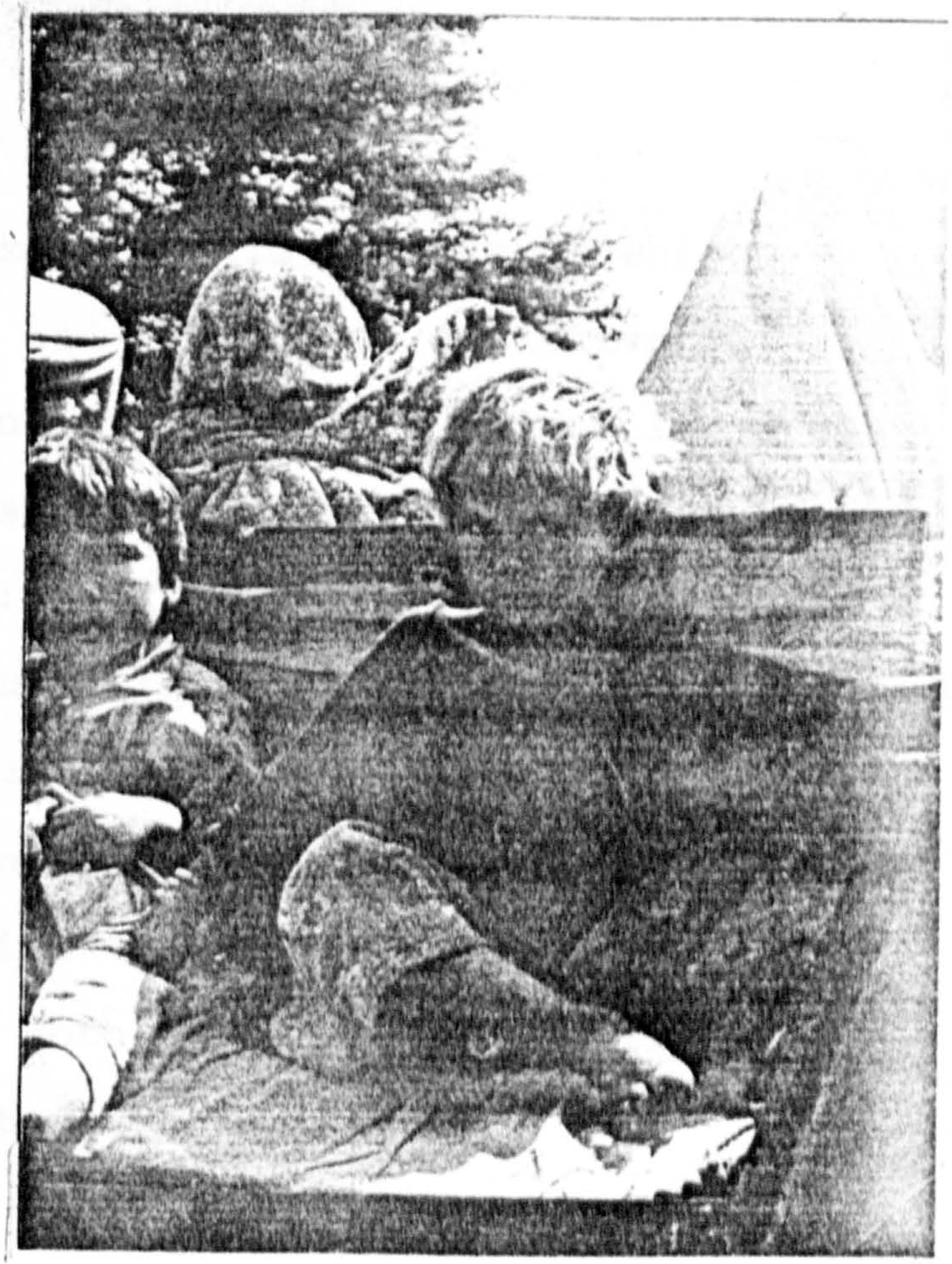
A traditional midwife with her equipment, a kitchen knife

An old woman said to be 100 years old

A woman possessed by jinns or evil spirits



A group of children



A village boy

Twins in swaddling clothes

Girls in a village school

3.5.2 Ownership of land

The total area of Daudzai is 51,690 acres of which 33,408 acres are cultivated and 17,268 are uncultivated. The 21 study villages of Daudzai, excluding Michni for which no records are available, have a total of 13,146 acres which is divided as follows: 5,121 acres covered by village sites and their hamlets, unmetalled roads, footpaths, rivers and streams; 1,346 acres of uncultivated land, i.e. banjar jadīd and banjar qadīm or new and old barren land; and 6,679 acres of cultivated land. The irrigation is from canal water and rain water.[28] However, both the rabi and kharif crops are produced on land irrigated by canal water.[29]

Land ownership patterns show that the area is composed mainly of small farmers: 52% of the total families owned 1-9 acres of irrigated land; 4.9% owned 10-59 acres; and only 5 families or 0.2% owned more than 60 acres (Figs 16a, 16b, 16c; cf. Pakistan, 1973, p. 15).

3.5.3 The agricultural year

The agricultural year revolves round the planting and harvesting of the major agricultural crops. The kharif crop or maize which is harvested in winter; and the rabi crop or wheat which is harvested in summer. The planting and harvesting of sugarcane overlaps both periods.

A. Rabi crop

This includes the harvesting of the wheat and the sowing of the sugar cane crop.

Wheat: The land is ploughed and flattened three or four times with ploughs driven by oxen. Then manure or fertilizer is applied to the soil before sowing the seed. The sowing of the wheat is usually completed by the month of November.

Three weeks after sowing the land is irrigated. This is repeated at an interval of 10-15 days depending upon the weather and the condition of the crop. A second dose of manure or fertilizer is usually applied after the second irrigation. Weeding is carried out to keep the crop clean from weeds. The harvesting of the wheat begins in the middle of April. The average yield per acre on land irrigated by canal water and rain water is 30-40 maunds and 10-15 maunds respectively.(1 maund=37.32 kilos or 112 lbs).

Sugarcane: This crop is sown on fallow land between November and December, and with the wheat crop in February when the wheat is two to three inches high. The method of sowing is either single set or side-by-side sowing. Fertilizer is applied to the fields and earthing up is necessary. The sugarcane crop requires a total of ten to twelve irrigations. In April when the wheat crop is harvested the sugarcane is about 1-2 ft. high.

B. Kharif crop

This includes the harvesting of the maize and sugarcane crop.

Maize: This crop is sown between July and August. The method is either by "broadcast" or by sowing the seeds in line. The distance between rows is 27 inches and between plants 9 inches. Fertilizer is applied and irrigation is necessary four to five times. The crop is harvested in October and the yield per acre is 30-35 maunds.

Sugarcane: Sugarcane is also harvested in October (field notes).

3.5.4 Domestic animals

Domestic animals play an important part in an agricultural society. They are used in agriculture and for food purposes.

A. Beasts of burden

Cattle and buffaloes are valued possessions and are usually owned by the richer farmers. They are used to pull ploughs and carts; to turn cane-crushing mills; to provide manure for fertilizer and fuel; and to provide dairy products. Buffaloes also serve as beasts of burden like donkeys. The animals are fed on fodder from the fields. Ownership of domestic cattle was as follows: 59% of households owned cows, 39% owned oxen, and 29.7% owned buffaloes (Figs 17a, 17b, 17c).

B. Goats, sheep and poultry

These animals are usually bred in the villages for dairy products and for meat. Most families owned poultry, and 37.9% owned sheep and goats (Fig. 17d). The latter are usually grazed on marginal ground between cultivated land.

3.5.5 Division of labour

The men in the family do the agricultural work, whereas the women are responsible for the household duties and the care of the domestic animals. They sometimes help in agriculture at harvest time. The work of men and women has already been mentioned under the functions of the household members.

3.5.6 Budget and credit

Analysis of the budgets of 2070 households showed that 12.4% were surplus, 55.6% were balanced and the rest, namely 32%, were deficient (Figs 18a, 18b, 18c).

As relatively few persons are able to obtain loans from government sources at a reasonable rate of interest, most villagers have recourse to moneylenders, with the result that there is considerable debt in the community.[30] In the case of 46.2% the main sources of credit were moneylenders, other villagers, friends, relatives and landlords. Only 0.8% obtained loans from government sources (Figs 19a, 19b). The main purpose for which money was borrowed was in the case of 27.4% for food, clothing and medicine; in the case of 10% for funeral expenses; 9.2% for marriage expenses; 7.0% for the treatment of illness; and 4.5% for the purchase of domestic animals (Fig. 19c).

3.6 RITES DE PASSAGE AND DISEASE

The Pathans are Sunni Muslims and observe certain religious and customary rites related to birth, marriage and death. The religious rites are celebrated publicly and are known as gham-khādi or sorrow-happiness. These ceremonial occasions are attended by relatives, i.e. agnates, cognates and affines, and by members of the muhalla or ward which is multi-caste in composition. The relatives who most frequently attend the ceremonies are agnates.

3.6.1 Pregnancy and birth

Among Pathans marriage is universal, and girls, unless seriously deformed, mentally abnormal or suffering from an incurable or contagious disease, are always married [31]

Within marriage there is an obligation to produce children. Women who do not conform, i.e. barren women, are not only ostracized in that they are shunned, especially when a child is being born,[32] but in more real terms childlessness is the cause of polygamy and sometimes divorce.[33] Therefore married women resort to all kinds of remedies, some of which are very painful, in order to beget children.

A. Childlessness

Childless women not only make pilgrimmages to ziārats or religious shrines to pray for children,[34] but they also undergo a local remedy for childlessness known as katwai or 'clay pot' treatment. This consists in applying a pot, in which a fire is kept burning and whose mouth has been sealed off with kneaded flour, to the abdomen of the patient on the third day of menstruation. The application is very painful and is sometimes repeated four to six times before it is considered effective. It is believed that the heat generated in the body by these applications is favourable to conception. During this treatment a strict diet of heat-giving foods is also followed.[35]

B. Pregnancy

When a woman becomes pregnant she continues her regular domestic duties but avoids strenuous chores. Dietary restrictions during this period include abstinence from 'cold foods',[36] since it is believed that they make the stomach contract and cause complications during childbirth. Tawīz or charms are worn to protect the mother and the unborn child against evil spirits. Husband and wife avoid sexual intercourse in the sixth or seventh month of pregnancy and do not resume intercourse until forty days after delivery. Women are considered impure during this period.[37]

C. Birth

When labour begins the mother is confined to a room which is kept warm by a stove in both hot and cold weather. Birth is usually attended by a female relative or a dai or local midwife (Fig. 20a, 20b). The position of dai is hereditary and she has no professional training in midwifery. Furthermore she is usually a member of the menial classes, i.e. the wife of the barber or musician. In very rare cases she is from a Pathan family.

Delivery may take place in any convenient position. Sometimes a woman reclines on the ground on a quilt.[38] But in most instances birth occurs in the squatting position. A sheet is placed under the woman where the child is expected to fall, the mothor holds on to a pillar whilst two women hold her shoulders to keep her in position.[39] If there are complications a compounder may be summoned. Women are only taken to hospital as a last resort.[40] After birth the dai severs the nap or umbilical cord with a razor, knife or scissors. Turmeric mixed with clarified butter is heated and applied to the wound. The expulsion of the bla or afterbirth is encouraged by massaging the abdomen.[41] It is believed that death in childbirth is caused by coldness or a failure to expel the afterbirth. The afterbirth is usually thrown away or buried outside the house by the dai.[42] Government-trained midwives do not offer the service of cleaning up after birth and are therefore not very popular.

The new-born infant is given a warm bath and then tied in a cloth which is fastened across the chest and arms with a band and tied at the ankles. Orwnaj or swaddling is continued for a year. It is believed that it strengthens the body of the infant and makes it straight. A knife, sickle or some other metal instrument, turned towards the child's head, is constantly kept by the mother's side to keep away evil spirits.

The infant is not given breast milk for three to four days, but is administered a ghutti or pootly, which is sugar tied in a cloth and dipped in purified butter. The mother is not permitted to leave the room for ten to fourteen days after birth. But the actual length of time that a woman is confined varies with her age and the number of women present in the household to take over her duties. In some households the mother resumes her normal duties after ten or fourteen days, but she does not become fully active until after chhila or expiry of forty days after birth.

Almost all children are breastfed. Female children are breastfed for two years, whereas male children are breastfed for two and a half years. Although suckling beyond this time period violates the Islamic injunction, some mothers continue to breastfeed their children for three to four years. However, if a mother becomes pregnant she usually, though not always, stops breastfeeding. A lactating woman avoids foods that cause acidity in her milk and which might provoke stomach pains or diarrhoea in the child.[43]

D. Religious ceremonies

There is no religious ceremony associated with the moment of birth. However, when a son is born all the young men of the ward gather outside the house where the birth has occurred and fire their guns to greet the good news. The birth of a daughter goes unnoticed. Some families also sacrifice a goat or a sheep as a token of thanksgiving.

Haqīqa: The naming of the infant usually takes place on the seventh day after birth, but in some families it is between the seventh and the fortieth day after birth. The ceremony is called the haqīqa or hair-cutting ceremony. The infant's hair is shaved by the barber, and the mullah or priest attends to help in the selection of a name. The Quran is opened at hazard by the mullah and the first letter at the top of the right hand page becomes the initial letter of the name. The name is then selected by the parents. The event is celebrated by the slaughter of a sheep or goat, and both the mullah and the barber are paid for their services (Ridgway, 1910, p. 35).

Sunnat: When the male child is between seven and eight years old sunnat, the circumcision ceremony, takes place. The operation is performed by the barber and is accompanied by feasting. The guests at the ceremony include members of the ward and relatives. They give a neondra or cash contribution to their host. He in turn repays this at a later date when he attends a similar ceremony in their families.

Circumcision is considered essential for men in order to acquire ritual purity which is a necessary condition for prayers. After circumcision the boy is taught the principles of the Islamic religion and the ordinary forms of prayer (NWFP, 1884, p. 87; Barth, 1959, p. 32).

It is important to note that all the ceremonies associated with the early stages in the life of a male are more sharply defined than in the case of females.[44]

3.6.2 Marriage

It has already been stated in the previous section that in the Pathan community marriage is almost universal.

A. Age at marriage

As a rule people marry when they are adults. Only in some cases are adolescents married, and child marriage is rare. The average age at first marriage was 19.39 years for females and 24.97 years for males. In the age group 25-29 91.7% of all females had been married, as compared with 70.4% of all males (Chapt. 5, Sec. 3.3).

B. Type of marriage

Cousin marriages: Among Muslims both parallel and cross-cousin marriages, i.e. children of siblings of the same sex and children of the siblings of the opposite sex, are permitted. In Pathan society marriages tend to be endogamous, i.e. within the tribe or lineage.[45] When relationships between adjacent lineages are bad,[46] making it difficult to marry outside the immediate lineage, there is a preference for marriage between closely related cousins. Furthermore, since exchanges of bridewealth and dowry are involved, this type of marriage has the advantage of keeping the social and economic ties within closely related kinsmen (Vreeland, 1957, p. 116). When a suitable female relative of the same lineage is not available in the village, a man usually procures a wife from another village from the same subsection.[47] In the study population 9.0% of all males stated that their birthplace was other than where they were settled, as opposed to 18.6% of all females. For ever married persons the figures were 13.3% and 35.0% respectively (Figs 21a, 21b). Mixed marriage between different tribes and castes is rare, and is only practised among members of the menial tribes, i.e. the carpenter, blacksmith, weaver etc., who intermarry freely among themselves.

Marriage prohibitions: Marriage to certain relatives is prohibited by Islamic law. This includes marriage to: siblings of father and grandfather; the wife's parents, grandparents, children and grandchildren; and the divorced wife of parents, grandparents, children and grandchildren. Furthermore remarriage with a divorced wife is only permitted if she has first consummated a marriage with another man. Marriage to all other women is permitted.

Arranged marriages: The sexes are strictly segregated; therefore all first marriages are arranged by parents or relatives,[48] rather than by the couple themselves. If the marriage is between relatives, the agreement is usually made when the couple are still young, although the marriage itself is not celebrated until they reach adulthood. Badal or exchange is also common among Pathans. It occurs when a sister or cousin is given in marriage in exchange for the marriage of the other person's sister or cousin (Ahmed, 1977, p. 27).

C. Marriage ceremony

There are various stages in the marriage ceremony and the rituals associated with each must be performed in the traditional way.

The fixing of the brideprice: The initiative is taken by the female relatives, i.e. the mother or aunt of the boy, in the form of a visit to the house of the girl's parents. If there is agreement, then this is followed by a meeting of the fathers of the two households to discuss the business side of the union or the sum of the brideprice.[49] The date of the betrothal is also fixed.

The kohizdena: On the day appointed for kohizdena or the betrothal ceremony, members of the boy's family and his ward proceed to the girl's village and are entertained by her family. A committee is then formed, consisting of three male members of the boy's family and the girl's nikah plar or marriage father, to agree on the thal or part payment of the brideprice. The bargain is usually completed after much haggling. This is followed by the kabul-ijab or formal acceptance of the engagement by the representatives. This ceremony is usually considered the first nikah or marriage. The betrothal is accompanied by some ceremonial,[50] but throughout there is segregation of the sexes, with the men in the guesthouse and the women in the house or courtyard. The betrothal ceremony may take place when the couple are still children, but usually it occurs immediately prior to marriage.

Khpiatra: The period between the betrothal ceremony and the marriage celebrations is called khpiatra or the period of much visiting, because the young man is expected to pay frequent visits to the family of his future wife and to bring her gifts on religious festivals. During these visits he is not permitted to see her.

Prekhun: This is the occasion, a few days before the marriage, when the final payment of the brideprice, excluding the mahr, is made in the form of cash, food and clothing.

Wāde: The wāde or marriage ceremony involves the removal of the girl from her parents' home to that of her husband. Marriages are usually celebrated in spring[51] on all days except Fridays. On the day of the wedding the jang or procession of the bridegroom's party go to collect the bride. Their arrival in the girl's family is followed by feasting and celebrations.

The religious part of the ceremony is conducted at night by the mullah or priest who proceeds to the mosque, accompanied the representatives of the bride[52] and bridegroom. The nikah or marriage service is recited, and the representatives speak on behalf of the young couple, repeating the acceptance three times. This is followed by a short discourse by the mullah, after which the couple are declared man and wife. The boy's father also announces the mahr or property in the form of jewellery or land in the name of the girl. This is never actually delivered. The service is followed by further ceremonial.[53] The following morning the bride is placed in a palanquin and taken to her husband's house where further celebrations take place (NWFP, 1931, pp. 116-117; Barth, 1959, 37-39; field notes).

Once the girl enters her husband's house, all responsibility for her passes from her father to her husband, and the husband has dominion over her and controls all her actions. When she dies, she is buried in the graveyard of her husband's village.

The marriage costs involve the payment of a brideprice, expenses for the feasting and celebrations, and payment to several members of the community for their services in the marriage ceremonial.[54] The expenditure can vary between Rs. 2,000[55] and 6,000. Most families find the cost a burden; 9.2% of all loans were raised for marriage expenses alone (Fig. 19c).

D. Polygamy

Polygamy is permitted according to Islamic law, yet only 4.0% of all households in the study area were polygamous (Fig. 22). This is because a bride costs money and only rich men can afford more than one wife. However, the poorer villagers do resort to polygamy in those cases where the first wife is childless. In polygamous households a man is expected to treat all his wives equally, and the junior wives are expected to be subordinate to the senior wife.

E. Divorce

It is comparatively simple for a husband to divorce his wife: if divorce is pronounced three times on a single occasion in the presence of two witnesses, it becomes irrevocable after a waiting period of three months. However, in the total study population only 3 males and 23 females stated that they were divorced or separated. This is partially explained by the fact that, if a husband is dissatisfied with his wife, he can remarry without divorcing his first wife. Another factor that makes divorce uncommon is the Pathan custom whereby, in cases of adultery, both guilty parties are put to death.

3.6.3 Death

When a person is nearing death the mullah is summoned to recite the Sura Yassin, or the heart of the holy Quran, in the ear of the dying man so that his life may end in peace.

A. Mourning

The mourning for the dead is done by the women of the ward. The corpse is placed in the courtyard on a bed and the women perform the wuzar or lamentations, which continue for an hour or more and can be heard at a great distance.

B. Burial

Ritual purification: If the deceased is a female then a woman of the house bathes the body. If it is a male the body is washed in the prescribed manner by a member of the menial tribe who receives a day's food for his labour and a pair of clothes of the deceased. Cold and hot water are mixed equally for the washing, because it is believed that the body of the dead is very sensitive. People who wash the corpse purify themselves with the prescribed ablutions beforehand. If a man or woman is killed in a case of tor or adultery, they are not given the ritual bath.

Preparation of the corpse: The corpse is wrapped in a shroud. The mullah cuts the cloth into pieces of required length: two pieces for a man, and four pieces for a woman including a veil and an undergarment. The chin of the corpse is tied with a piece of cloth and the two big toes are fastened together with a string. The corpse is then placed on a bed and covered with a sheet, a white sheet in the case of a man and a red sheet in the case of a woman.

Burial: The burial takes place on the day of death. Once the corpse has been prepared for burial, it is carried to the graveyard on a bed by four men and followed by a procession of the male relatives and male members of the ward or quarter. Women do not participate in the procession.

The corpse is deposited near the kabar or grave which has been prepared by ten or fifteen men, and the assembly, led by the mullah, face west to offer the janaza or burial prayers. At the conclusion of the prayers the body is lowered into the grave.

The grave lies north and south and contains a lahad or small sepulchre on the west side of the grave, slightly below the level of the floor of the grave. The body is placed in the sepulchre with the face uncovered and facing Mecca. The sepulchre is sealed from the grave by large upright stones placed against its opening. The grave is then filled up with earth, none of which reaches the corpse in the sepulchre.

The earth is banked up over the grave, and large flat stones are placed at its head and foot. In the case of a man, the stones are set with the flat sides parallel to the length of the grave, whereas in the case of a woman the flat side of the stone is at right angles to the length of the grave.

After the funeral rites, khairat or alms are distributed to the poor, and this is repeated on the fortieth day after the death. In the family where the death has occurred food is not cooked for two to three days.

The expenditure on burial ceremonies is between Rs. 1,000-6,000. It includes the purchase of material for the corpse, i.e. cloth, perfume etc.; rice which is cooked and distributed among the mourners; and money for alms (NWFP, 1884, pp. 90-92; field notes).

3.6.4 Disease

In recent years epidemic diseases such as plague, smallpox and cholera have been successfully checked in the study area with mass eradication campaigns of preventive medicine. But disease is still a major problem among the population. Many types of diseases are recognized and various remedies are applied according to the diagnosis of the symptoms.

It is believed that diseases are caused by the improper functioning of the body and by supernatural powers. As regards the latter, sickness may be ascribed to an individual with the 'evil eye' or to the machination of jinns and spirits, whom, it is said, may enter and take possession of a person. To ward off the 'evil eye' and exorcise evil spirits, people frequently have recourse to sorcery. But sorcery is also employed for malevolent purposes.[56]

The remedies to disease are traditional medicine; magico-religious methods; and western medicine. Traditional and western medicine are usually used for disorders caused by the improper functioning of the body; the magico-religious methods are employed for disorders, such as mental illness and epilepsy, that are attributed to supernatural powers, or they are employed in combination with the above or when other remedies fail. Several treatments may thus be applied, either successively or simultaneously.

A. Indigenous or traditional medicine

The Pathans resort to three types of indigenous treatments, the yunani, the dzan and the dam, which are primarily curative.

Yunani medicine: This is practised by hakīms or indigenous practioners of the Grecian School as opposed to the Misri or Egyptian School of medicine. They usually live in cities and visit the villages.

The remedies are applied in order to expel the offending matter that has caused the putrefaction of the humours.[57] In this system of theraupeutics the properties of the remedies or medicines are derived from what is regarded as their elementary or cardinal qualities, i.e. heat, cold, moist and dry. If a disease is classed as hot, a medicine with the opposite virtues has to be prescribed.[58] The medicines are composed of vegetable preparations, and few metallic compounds or poisonous drugs are used. [59] Blood letting and couching for cataract is frequently practised by hakīms.

Dzan: This treatment is normally applied in cases of fever, acute or chronic, and for a variety of other complaints, including rheumatism, childlessness in women or complaints that cannot be diagnosed.

It consists in powstakai achawūna or skin wearing. The patient is stripped to the skin and placed on a bed. A sheep or goat is slaughtered and skinned, and the patient is wrapped in the skin with the raw surface turned inwards. The skin is stitched and he is covered with a number of quilts. A stove is kept constantly burning under the bed. The covering is removed on the second day in summer and the third day in winter. It results in profuse persperation. If the first application is not successful it may be repeated several times. It is believed that it is an effective cure for rheumatism and fevers.

In case of a fractured thigh the sheepskin is tied on a rough splint and applied externally. It is left for a week or more. For small wounds the skin of a fowl is used (Pennel, 1909, p. 39).

Dam: This treatment is used for a variety of complaints especially indigestion, neuralgia and paralysis. The remedy is as follows. A piece of cloth is rolled into a small pledget, dipped in oil, applied to the relevant spot and set alight. It burns down into the flesh and a hard slough is formed. This gradually separates and leaves an ulcer which ultimately heals. The operation is usually carried out by women and the spot of application varies according to the illness. For example for indigestion the treatment is applied to the abdomen, for neuralgia to the temples and for paralysis to the back.

Other operations, which include opening an abcess or lancing a gum, or blood-letting, are performed by the village barber. The blacksmith, on the other hand, specializes in extracting teeth and women treat wounds (Ibid., p. 40; field notes).[60]

B. Magico-religious methods

Magico-religious methods include tawīz or charms; exorcisms; mantar or recitation of magical formula; and visits to ziārats or holy shrines.

Tawīz : The use of charms and amulets is universal in the area. The charm generally consists of a verse from the Quran which is sewn into a cloth or leather case and worn round the neck. They are either made and blessed by mullahs or by holy men. It is believed that they protect the individual, particularly children, against nazar, the evil eye or envious eye.[61]

Exorcism: When a person becomes possessed by a jinn[62] or spirit, exorcism is performed to cure them. This is either done by the mullah or a holy man. It consists in anointing the patient with oil and reading verses from the Quran.

Mantar: Women tend to specialize in magical cures. When a person has had an accident, such as a scorpion or snake bite, a mantar or a magical charm is recited. There are two types of mantar, one is used for the ordinary man and woman and the other for pregnant women. There are only certain people who are qualified to perform them and they have learnt them either from a relative or a mendicant.

Ziārats: The ziārat or holy shrine is visited by all men, including the educated, to seek a cure for disease. But women are the most ardent pilgrims to the holy shrines. Each shrine has its own particular reputation for the cure of specific complaints.[63] On each visit certain rituals are performed.[64] It is believed that the holy shrines have performed many cures.[65]

B. Western medicine

In Daudzai thana there are three dispensaries and three weekly visiting dispensary facilities, staffed by one medical technician, three dispensers, three vaccinators and three sanitary patrols, which provide western medicine to the population of the 89 villages and their hamlets in the area.

Preventive measures: The preventive measures are anti-chicken pox, and anti-cholera inoculation; smallpox vaccination and revaccination.

Curative measures: These include the treatment of adult patients and children suffering from minor complaints by the prescription of drugs.

Sanitary measures: The sanitary patrol in charge of the area organizes the clearance of garbage and cowdung; the cleaning of drains and pits; the disinfection and chlorination of wells; and delivery of lectures on health education (Khan and Shah, 1973, pp. 16-17).

Hospitals: There are no hospitals in the area and people have to travel to Peshawar city in cases of serious illness. Women, who are already discouraged from travelling to cities because of the restrictions imposed by the pardah system and their firm belief in the efficacy of indigenous medicine and magico-religious cures, find the distance a further reason for not going. (For details of type of treatment by sex see Chapt. 6, Sec. 6.4).

3.7 EDUCATION AND DEVELOPMENT PROGRAMMES

In the study area both education and development programmes are geared to provide for the needs of the male population.

3.7.1 Education

In Daudzai there are a total of 75 centres of education for males. These include: 48 primary schools, 2 middle schools, 2 high schools, 7 masjid maktab or mosque schools, and 16 centres of adult education. On the other hand, there are only ten centres of education for females. These include 9 primary schools and 1 middle school (Khan and Shah, 1973, p. 1). In Michni there is both a primary school for girls and boys.

Out of the total population in the study area 6.5% of males had received nine years of schooling, yet only 0.5% of females had received one year of schooling; 18.2% of the males stated that they could read and write, whereas the corresponding figure for females was 0.3% (Figs 23a, 23b). The spread of primary education has created a technical and cultural gap between men and women.[66]

3.7.2 Development programmes

The Daudzai project was initiated in 1972 by the Pakistan Academy for Rural Developement and was based on the Comilla experience. The aim was to improve the economic and social condition of the rural masses by involving them directly through village cooperative organizations.

The headquarters of the project, situated in Nahaqi village, are staffed by officers from several government Ministries, such as agriculture, health and family planning, animal husbandry, forestry, cooperatives, revenue, electricity, roads and irrigation, and are under the direction of the Project Manager. Their duties are to assess the needs of the rural population and find a solution within the local context.

The project established a village cooperative organization to serve as a forum for the villagers at the grass-root level. The representatives of each village cooperative organization were given extension training fortnightly at the headquarters of the project in animal husbandry, land improvement, health and family planning. This training was then fed back to the villagers through their cooperative organization in their weekly meetings.

The project is primarily geared to educate men in the necessary technical skills.[67] Women's programmes are being planned, but to date only one industrial centre for training women has been set up at Nahaqi village (Khan and Shah, 1973, pp. 1-26: Khan et al., 1974, pp. 1-33)

3.8 CONCLUSION

The purpose of this chapter was to describe the area where the census was conducted; to analyse the social and economic structure of the village; to explain the customs and conventions governing the position of women; and, in so doing, to throw light on the methodology of fieldwork and the quality of the data.

The study area is situated in the district of Peshawar in the North West Frontier Province of Pakistan. The indigenous occupants of the area can be divided into two main groups: those of Afghan origin and those of non-Afghan origin. The Pathans are of Afghan origin, and are divided into several tribes. These tribes are divided into khels or clans, each comprising various families.

The Pathans claim descent from one of the lost tribes of Israel, a theory which most scholars have disclaimed as a myth. The tribes who lived in this region in the time of the ancient Greeks were Aryans who had come from Central Asia a millennium earlier. Their blood was later mixed with invaders from the same area.

The 22 study villages in Daudzai thana and Michni tribal area numbered 14,062 persons, with a sex ratio of 1084 males to a thousand females. The villagers belong, for the most part, to the Mohmand and Daudzai tribes. Many of the villages are surrounded by water and communications are bad.

The villages are divided into quarters or wards, called muhalla or kandi. A separate ward was allotted to each clan in the original distribution of land forming a village site. Each ward has its own mosque and guesthouse, and these buildings are generally situated on the outskirts of the village.

There are two types of dwellings in the study villages: pukka or dwellings made of cement; and kucha or mud dwellings. Only the wealthier farmers have cement houses, and there were very few of such dwellings in the study area. The results showed that 82% of all households owned their house, and that 76.8% of the houses had no more than two rooms.

Each household is an independent economic unit, comprising an elementary or a joint family. The most common types of family in the study area were the elementary family, consisting of married couples and their unmarried children; and the joint family, consisting of spouses of the head, their unmarried children, married sons and widowed parents. Extended joint families of married siblings and their spouses living together were rare.

Pathan families are patrilineal and patrilocal. The senior male member holds complete authority over other members of his household. His main functions are connected with his employment, which, in the case of agriculture, include ploughing, planting and harvesting. Women's duties are mainly confined to the home and the care of domestic animals. Children also participate in the work from an early age.

There is no pardah in the villages, in the sense that women do not veil their faces; they only do so if they have to make a journey elsewhere. But there is a complete segregation of the sexes, which is even maintained within the family where men and women eat separately. One consequence of this segregation is that men are reluctant to mention the names of their adult female relatives in public.

In Pathan society there are three classes, and membership is determined by birth. The highest class is the saintly class or aztanadar, people descended from saints. They include Sayyids or direct descendants of the Prophet, pirs or descendants of Pathan saints, and mians or descendants of non-Pathan saints. The second class is that of the landowning tribesmen. They include khans and arbabs, rich landowners, few of whom were found in the study area, and the daftari or holders of ancestral shares in the land. The third class consists of the hamsayas or dependents, who are protected by a Pathan tribe, but are excluded from membership of the tribe. They include the mullah, landless farmers and various tradesmen and artesans.

The village has a social and a government organization. The social organization finds expression in the jirga or village council, attended by the headman and elders. Its functions are to decide upon matters of common interest, to make petitions to the government and to settle disputes among families. The government organization is represented by the village headman, who collects the land and water taxes; the tchowkidar or village watchman, who reports births and deaths; and the patwari or revenue and land record's clerk. The first two reside in the village and their duties are hereditary; the latter visits the village in connection with his duties.

The common land held by the tribe was originally divided into hereditary lots called daftar, which were subdivided into family lots called bakhra, giving each tribe or clan a fixed share in the land. Inheritance of bakhra is based on the equal division of the land of the deceased by all male heirs. Despite the Quranic law which stipulates that girls should inherit half what their brothers inherit, women are excluded from inheritance.

The total land area of the 21 study villages of Daudzai is 13,146 acres, of which 6,679 acres are cultivated. Irrigation is mainly from canal and rain water. Land ownership patterns show that most of this land is cultivated by the small farmer: 52% of the households owned 1-9 acres of irrigated land; 4.9% owned 10-59 acres; and only 5 families or 0.2% owned more than 60 acres.

The year is divided into two periods which revolve round the planting and harvesting of the major crops: the *kharif* crop or maize, harvested in winter, and the *rabi* crop or wheat, harvested in summer. The planting and harvesting of sugarcane overlaps both periods.

Domestic animals are used to pull ploughs and carts, to provide manure for fertilizer and fuel, and to furnish the villagers with dairy products and meat.

Analysis of the budgets showed that, at the time of the census, 32% of families were in debt. The main sources of credit were moneylenders and relatives, and the debts were chiefly incurred for agricultural activities and for ceremonials associated with the *rites de passage*.

Pathans are Sunni Muslims, and observe certain religious and customary rites at birth, death and marriage. Among Pathans marriage is universal, and it is considered essential that a married couple should produce offspring. Childless women employ various remedies to become pregnant: they visit shrines to pray for children or they undergo a painful process called the *katwai* or 'clay pot' treatment. During pregnancy women continue their normal duties; they restrain from eating 'cold food', and wear charms to protect themselves and the unborn child from the 'evil eye'. Delivery usually takes place at home attended by a female relative or a *dai*.

If there are complications a compounder may be summoned. It is only in the last resort that pregnant women are sent to hospital. Death in childbirth is generally attributed to coldness or the failure to expel the afterbirth.

The early stages in a child's life are much more clearly defined for males than for females. The birth of a boy is greeted with celebrations, whereas the birth of a girl goes virtually unnoticed. The haqīqa ceremony occurs seven days after birth: the infant's hair is shaved and the infant receives a name. Circumcision is performed when the boy is about eight years old, after which he is instructed in the tenets of Islam.

As a rule people marry when they are adults. The average age at first marriage for those married only once was 19.39 years for females and 24.97 years for males. Marriages tend to be endogamous, i.e. within the tribe or lineage, often between closely related cousins. As families are patrilocal, it is more common for the bride than the bridegroom to come from a neighbouring village: 9.0% of all males stated that their birthplace was other than where they were settled, as opposed to 18.6% of all females. Exogamous marriages are common among members of the menial classes.

Since the sexes are strictly segregated, all first marriages are arranged by parents or relatives, rather than by the couple themselves. The stages leading up to marriage are extremely elaborate. Marriage is expensive and can cost between Rs 2,000-6,000; many families have to incur debt in order to meet the expenses.

Polygamy is permitted by Islam, but only the richer farmers can afford more than one wife. The poorer farmers only resort to it if the first wife is childless. Only 4.0% of the households in the study area were polygamous.

Although it is very easy for a man to divorce his wife, divorce is considered shameful and is not widely practised.

Death, like marriage, is an occasion marked by specific rituals. The expenditure for burial ceremonies is between Rs 1,000-6,000.

Disease is still a major problem in the area, although in recent years many of the epidemic diseases, such as plague, smallpox and cholera, have been controlled. Diseases are attributed either to the improper functioning of the human body or to supernatural powers. Remedies may be divided into three categories: traditional medicine; magico-religious methods; and western medicine.

The traditional or indigenous medicine consists of the yunani medicine, based on the Grecian school and practised by hakīms; dzan or the application of a sheep or goat skin in cases of fever and a variety of complaints; and dam or what in western medicine is known as moxa. Other operations such as lancing a gum, blood-letting or extracting a tooth are performed by the village barber and blacksmith.

Magico-religious methods include the wearing of amulets to ward off the evil eye; the exorcism of evil spirits; the recitation of charms against snake bites and other ailments; and visits to shrines to seek cures.

In Daudzai there are three dispensaries providing preventive and curative medicine and sanitary measures. But there are no hospitals, and people have to travel to Peshawar in cases of serious illness. For women, who are discouraged from making the journey because of the pardah system and their belief in indigenous medicine, this is especially inconvenient.

Education and development programmes in the area are geared to provide for the needs of the male population. Only

0.5% of all females had received one year of schooling, whereas 6.4% of all males had received nine years of schooling. The literacy rate for males and females was 18.2% and 0.3% respectively.

The Daudzai project, which operates through village cooperative organizations and aims to improve the economic and social condition of the masses, trains the village representatives in various fields, i.e, agriculture, animal husbandry, health and family planning. This education is disseminated at the village level during the meetings of the cooperative organizations. Apart from a small industrial training scheme in Nahaqi village, women to date have been totally excluded from the development project.

FOOTNOTES

1. One of the Provinces of West Pakistan. The Muslim nation of Pakistan was created in 1947. Three provinces Sind, Baluchistan, North West Frontier Province and part of Punjab were detached from the Indian Subcontinent to form West Pakistan. Two-thirds of Bengal and parts of Assam were taken to form East Pakistan. The latter became the indeпendent state of Bangladesh in 1971. See R.Symonds, The Making of Pakistan (London: Faber & Faber, 1950); K.Bin Sayeed, Pakistan, The formative phase (Karachi: Pakistan Publishing House, 1960).
2. With the exception of Hazara District and parts of Kohistan.
3. Durand line, called after Sir Mortimer Durand, who in 1893 signed an agreement with Afghan Amir Abdur Rahman which separated Afganistan from India.
4. The districts are : Peshawar, Bannu, Dera Ismail Khan, Hazara, Kohat and Mardan. Each district is administered by a district commissioner and the district board.
5. The tribal area consists of small sections of territory attached to each of the settled districts and . six agencies: Malakand, Mohmand, Khyber, Kurram and North and South Waziristan. The regular laws and administration of Pakistan do not apply to the tribal agencies. Order is maintained by means of indigenous tribal assemblies called jirgas. Jirgas are selected by the government political agent and guided by Puktunwali, the Pathan code of honour, and the Frontier Crimes regulation laws dating back to 1901 (Spain, 1957, p. 136; Ahmed, 1977, p. 40).
6. There are four main groups of Pathans: the Durranis and the

Gilzai nomads who live in Afghanistan; 'the independent or free tribes' who live mostly in tribal territory and also in the settled districts; and lastly the detribalized clans who only live in the settled districts (Spain, 1975, pp. 24-25).

7. Mohmand, the ancestor of the Mohmand tribe, the major tribe of the study, had four sons: Tarakzai, Halimzai, Khwaizai, and Baezai. Tarakzai, one of the sons, is the ancestor of two clans: Dadu <u>khel</u>; Kasim <u>khel</u>. The former is subdivided into families: Dalka <u>kor</u>; Shah Mansur <u>khel</u>. These subdivisions continue into the present generation. For details see Appendix 3.

8. Kais had three sons, one of them Sarabun had a son Kharshbum, the ancestor of the main Pathan tribes. From his brother Sharkabun are descended the Tarins, Shiranis, Mianas, Waraiches, Urmar and other smaller tribes (NWFP, 1931, p. 122). See Appendix 2.

9. Supporters of this theory find corroboration in the testimony of the Prophet Esdras to the effect that the ten tribes of Israel, who were taken into captivity, found refuge in the country of Arsareth, which is identical to the present Hazārah and of which Ghor forms part' (Crooke, 1896, p. 157).

10. The Pathans are governed by a code of honour called <u>Pukhtunwali</u>. It imposes on them three chief obligations: <u>nanawati</u> or the right of asylum, which compels them to shelter and protect even an enemy who comes as a suppliant; <u>badal</u> or revenge by retaliation; <u>malmastia</u> or open-handed hospitality (Spain, 1975, pp. 46-48).

11. The Pathans have the Passover-like practice of sacrificing an animal and smearing the doorway with blood; they also sacrifice animals and practise the periodic distribution of land. Ibbeston, Punjab Ethnography, para. 390. Cited by Crooke, 1896, p. 157.
12. Adam, Ibrahim, Musa, Isa, Daud, Yusuf (Spain, 1975, p. 28).
13. Bernhard Dorn, Chrestomathy of the Pushtu or Afghan language (St.Petersburg: Imperial Academy, 1847). For a detailed discussion of the subject see Caroe, 1956, pp. 3-103.
14. The districts are further subdivided into units called tehsils. Peshawar district is composed of three tehsils: Peshawar, Charsadda, Nowshera. Each tehsil is under a tehsildar or revenue clerk. The rural areas of the tehsil are further divided into zail or revenue circles and into thanas or police wards (Vreeland, 1957, p. 111). Daudzai thana, the area of this study, is one of the six thanas in Peshawar tehsil. The others are: Saddar, Mattira, Badber, Mattiani and Tehkal. Each thana is composed of several villages.
15. Tribes of Indian as opposed to Pathan origin.
16. For details of the division of the study villages into kandi or quarters see Appendix 4.
17. These maliks or chiefs represented their khel or clan in the tribal jirga or assembly. But the custom is only prevalent in the tribal areas today (Spain, 1957, p.140).

18. 'We work hard and men work hard, but in our work there is no blessing. On the work of men is great blessing, from it comes much produce, but from the work of women comes nothing that can be exchanged ' (Darling, 1934, p. 281). See also Crooke, 1897, p 230.

19. Even if a wife is living in an elementary family separate from her husband's family, she can sit with her husband, but she never eats with him. It is only when both her husband and children are satisfied that she can eat herself of whatever remains. Her inferiority is further marked in that she may never sit on a charpoy or string bed if her husband is sitting on the floor (Darling, 1934, p. 287).

20. In earlier times, when early marriage was the norm and the joint family system was almost universal, the mother-in- was frequently tyrannical, as the following passage shows: 'When a bride first visits her husband's home, everybody shows affection to her and she is treated as a guest. Her mother-in-law does not speak ill of her and her father-in-law tells everyone to treat her gently and give her only light work. But on her next visit she finds everyone, except her husband, changed, the mother-in-law is critical and the father-in-law indifferent and the children tell tales. There is also more work to do...When she next returns to her parents' home she is much less inclined to leave them, and when someone comes to fetch her from her mother-in-law to escort her back, one excuse after another is made to put off the evil day. But she must go, and the most trying time of her life begins, her mother-in-law nags her for eating too much and not doing enough work...If she becomes a mother her position improves, but if she remains childless she is eyed superciliously by her elders and there are whispers of a second marriage' (Ibid., p. 286).

21. For the ill effects of the pardah system, i.e. when women are confined to the house, see K.O. Vaughan, The Purdah System and its Effect on Motherhood (Cambridge: W.Heffer & Sons Ltd., 1928).

22. F.Barth writes that 'sociologically they might be classified as estates or castes. They differ from caste in that they are without ritual or religious importance...The ritual pollution in Islam derives from body processes such as elimination, sexual intercourse and death. Since all men are equally vulnerable to these sources of pollution purification depends on repeated ablutions' (Barth, 1959, pp. 17-18).

23. The mullah or village priest does not hold as privileged a position as the saintly classes. But he is a respected member of the community, and for his services receives rent-free land to cultivate as well as alms and offerings.

24. Among those who do not own land but work on it as tenants or labourers are four groups: the ijaragar, 'rent companion' or farmer, who for a specified period rents land and in return pays in kind and ~~poss~~ complete control of the land and the freedom to sub-let it if he so desires; the dehqan or agricultural labourer, who is supplied with land, seeds, tools and animals, and in return for his labour receives a share of the produce; the faqir or labourer who works on poor marginal land, usually in the village hamlets, and pays for this right in labour or in kind; the mazdūr or wage-labourer, who is a landless peasant employed at harvest time to do work which is usually done by women, e.g. cleaning the maize crop, receiving for his services a share of the crop or Rs 5 per day (NWFP, 1884, p. 128; Barth, 1959, p. 44).

25. The important menials in the village community are the tarkhān or carpenter, who makes and repairs the wooden implements of agriculture for which he receives a fixed share of the crop, and who, for other private work, i.e. making beds etc., receives cash; the lohār or blacksmith, who repairs all the iron implements of agriculture and at harvest time receives a share of the crop; and the nai or barber, who in addition to the work of his profession, extracts teeth, bleeds those who require bleeding, performs circumcision, and plays an important role in the marriage ceremony, and who, for his services, receives a share of the harvest and a fee in cash at ceremonies (NWFP, 1884, p. 133).

26. The distribution occurred about 1600 and was known as Shaikh Mali's taksim (Ibid., p. 120). The mode of distribution is described by Dr Bellew: ' the land to be divided is first marked off into compact blocks called wand, each of which is subdivided into the required number of allotments. ... the redistribution is regulated by lot or casting of the pucha. The representatives of each khel or clan to share in the distribution selects a piece of wood, rag, stone or grain of corn and hands it over to the mashar or greybeard appointed to cast the lot. The greybeard walks round the wand and throws at random a token into each of the plots marked off. The several plots then become the possession of the khels, severally represented by the tokens thrown into them. Each plot is then successively divided and allotted in a similar manner to the division of the khels and their several respective families. In the ultimate divisons, the portions of land are very small and are called pucha after the process described' (Bellew, 1879. Cited in NWFP, 1884, p. 121).

27. Tradition has it that the Daudzai tribe lost some of their villages to the Tarakzai Mohmands in the following way. The Tarakzais who were settled in the north-east of Peshawar in the reign of the Emperor Jahangir, 1605-1627, moved from there and settled in Michni. Later in the tribal fighting with the Daudzais they lost some men and were able to extort from them two villages as blood money. In Ahmad Shah's reign, 1748-1773, Zain Khan, ancestor of the Morcha Khel, was recognized as Khan by the government and twelve villages in the area were made over to him 'in consideration of the fact that the Tarakzais command the dams which turn the water of the Kabul river into irrigation cuts of Khalil, Daudzai and Khalso' (James, Settlement Report, 1862, pp. 119-121; 1865).

28. In the study villages the irrigation of cultivated land is from the following sources: 4,491 acres from nehri or canal water: 2,076 from barani or rain water; and 70 from dogaba or pond. In the study villages there was no irrigation from wells, although this type of irrigation does exist in Daudzai (Census of Pakistan, 1971. Cited by Khan and Shah, 1973, pp. 8-11).

29. In 1972 in 86 of the Daudzai villages from a total of 28,985 acres the following number of acres were devoted to the following crops during the rabi or spring season: wheat 1,978 acres; barley 50 acres; fodder 241 acres; vegetables 56 acres; fruit 226 acres; and tobacco 5 acres. The figures for the kharif or autumn season were as follows: maize 1,768 acres; sugarcane 1,328 acres; rice 36 acres; vegetables 110 acres; fruit 89 acres; fodder 92 acres; and miscellaneous crops 33 acres (Ibid., pp. 12-13).

30. For the effects of debt in the community see M.Darling, The Punjab Peasant in Prosperity and Debt (London: Oxford University Press, 1947).

31. Unlike tuberculosis, smallpox scars, although considered a deformity, do not cancel out a girl's chances of marriage. They merely reduce her value in terms of a brideprice. In the study the three women who had never married and were above 60 years of age had tuberculosis.

32. In some parts a woman whose children are born prematurely and generally die is not allowed near the pregnant woman or a mother about to give birth (Rose, 1905, p. 280).

33. For similar ostracism in other societies, see P.C.Rosenblatt and W.J.Hillabrant, 'Divorce for Childlessness and the Regulation of adultery', <u>Journal for Sex Research</u>, VIII (1972), 117-127.

34. For visits to shrines see Sec. 3.6.4.

35. <u>Halwa</u> made of wheat flour, purified butter and molasses is believed to have heat-giving properties.

36. Yoghurt , pulses, cold water, as opposed to 'hot foods' which are purified butter, eggs, meat of old hens etc.

37. Women are also considered impure during menstruation. For detailed discussion see F.W.Young and A.A.Bacdayan, 'Menstrual taboos and social rigidity', <u>Ethnology</u>, IV (1965), 225-240.

38. With her head to the north and her feet to the south, she thus faces Mecca and if she dies in childbirth she expires in the posture in which Muslims are buried (Rose, 1905, p.237).

39. See Frada Naroll and Raoul Naroll, 'Position of women in childbirth', <u>American Journal of Obstetrics and Gynaecology</u>, LXXXII (1961), 943-954.

40. Dr. Vaughan describes the pregnancy cases that were brought to the hospital: 'the cases arrived at the hospital in a state of extreme exhaustion and when septic. They were carried there on a bed by the nearest male relatives, after

every attempt had been made for days at home by native midwives, who had exhausted every device known to them to produce delivery. On inspection it was easy to see that the foetal head was well above the brim, with no possibility of its ever entering the superior strait. The bowels were loaded, the bladder full and in some cases a catheter could not be passed. The vulva was swollen, excoriated by the pressure of the midwife's feet, who uses them to help matters...In her per vaginam, there was always some foreign body to be removed, string, rags, pellets of grey earth... straw and even cowdung' (Vaughan, footnote 21, p. 2).

41. In some areas the mother is told that she has given birth to a one-eyed girl, in order that the heat engendered by the ill news may force out the afterbirth quickly, and the joy of having given birth to a male child may not retard it (Rose, 1905, p. 237).

42. Among some Muslims it is believed that the cord of the first-born is particularly susceptible to the influence of the jinn or evil spirits and the evil eye. To counteract this a bit of charcoal and turmeric are thrown into the pot in which it is buried (Ibid., p. 238).

43. Potatoes, lassi or milk from which butterfat and curds have been removed, fish, lemons etc. (Honigmann, 1958, p. 18).

44. Among the Muslim community in India the birthday of each son is regularly celebrated. The term used for this occasion is saul-girrah. The name is derived from saul or year and girrah or to tie a knot. The custom is maintained by tying a knot on a string kept for the purpose by the mother. The girl's years are numbered by a silver loop or ring being added yearly to the silver neck-ring. These are the only methods of registering the ages of Muslim children (Meer, 1882, p. 215).

45. The tribe is divided into several large lineages called <u>khel</u>, which are composed of those people descended from a particular male ancestor, below the tribal ancestor. The heads of the lineages are said to have been brothers. The lineages are subdivided into <u>kors</u> or families (Vreeland, 1957, p.116). See also footnote 7 above.

46. The complex system of inheritance, unequal status of brothers and polygamy produce conflict over the division of land: male heirs in principle inherit equal shares in the lands of the deceased, but in practice the plots vary in size, quality and accessibility; younger brothers are subordinate to elder brothers, who sometimes misuse their authority; and there is also dissension between rival wives. When the conflict results in violence, the Pathan code of honour requires retaliation or <u>badal</u> in the form of blood revenge. This often leads to bitter feuds and the break-up of one family into two families. Cousins then become enemies, and it is significant that the word for cousin, <u>tarbur</u>, is synonymous with enemy. Thus from this division the two families become separate lineages (<u>Ibid.</u>, pp. 117-118).

47. Honigmann found that a study of genealogies showed that each lineage had one or more closely related villages from which women were secured for marriage (Honigmann, 1958, p. 51).

48. According to Islamic law, 'all women, and all men below puberty, have a legal marriage guardian without whose consent no marriage may take place. The marriage guardian

further has the right to impose marriage on persons below puberty. In Pathan society this right is continued througout the life of the female charge and into the adulthood of the male. Marriage guardianship is vested in the nearest male agnate (Barth, 1959, p. 37).

49. The brideprice is divided into three parts: mahr or promise of an endowment in jewellery or land which is never actually made; wāde dapāra or for wedding expenses, i.e. foodstuffs, bedding etc.; da jinei da sār rupei or money for the girl's head (Ibid., p,37). In a badal or exchange marriage only clothes are prepared for the girls to be exchanged, and each family gives to their future daughter-in-law the exact amount that they themselves expect to receive in return. The Mohmands in the settled areas usually spend the money received for the girl's head on clothes and jewellery for the girl. In the tribal areas this money is kept by the girl's father (field notes).

50. Sweets and milk are passed among the male guests. Each man drinks one drop known as kohizdena got. The guests then offer neondra or money contributions, generally between five and fifteen rupees. This is collected by the barber and given to the father of the boy to help out in marriage expenses (field notes).

51. Marriages take place in the month of Shawal or Rajab, and seldom in the month of Muharram which is considered unlucky for marriages, and never during the month of Ramazan or fasting, nor at Loe Akhtar ('Id al-Adhā), which is a time for making the pilgrimage to Mecca.

52. Three men are sent to the girl and she chooses one of them to represent her, the <u>nikah plar</u> or marriage father, and the other two are <u>gowahn</u> or witnesses.

53. The bridegroom enters his father-in-law's house and is presented with a gift of clothes. He is then made to sit on a bed which is lifted into the air three times by his companions. Various gifts of money are exchanged. The bridegroom receives a gift of Rs 10-50, known as <u>salami</u>, when he pays his respects to his parents-in-law. He also has to pay the barber Rs 5 or 10 for helping him on with his new clothes. For Muslim marriage customs see Rose, 1919, pp. 228-232; Jones, 1941, pp. 96-114; Moer, 1882, pp. 179-209 .

54. The barber plays a key role in marriages as a messenger and in the ceremonial. For his services he usually receives Rs. 70-250 per marriage; the cook receives Rs. 10 per dish; the boatman Rs.10 per marriage; the carpenter Rs. 20-30 for the wedding bed; the <u>mullah</u> Rs. 10-25 for the religious service; the barber's wife Rs. 10-30 for dressing the bride; the musicians Rs. 25 for entertainment; and finally Rs. 2-5 to the members of the saintly class (field notes).

55. A family with an income of Rs. 4,000 per annum in Michni had to borrow Rs. 2,000 from a moneylender, at a rate of interest of 15 maunds of wheat per annum, for their son's wedding in 1977. Excluding the payment of money on the girl's head, the expenses were as follows in rupees: 800 for girl's clothes etc.; 500 for rice, cooking butter; 100 for meat; 125 for jewellery; 30 for dried fruit, henna; 125 for boy's clothes; 35 for bed; 80 for bedding; 30 for sugar and tea; 155 for miscellaneous purposes including payments to musicians, barbers etc. (field notes).

56. Women are particularly versed in the art of sorcery. Shisakhai, also known as bala or witches, are endowed with the power of black magic. One of their practices is to visit a graveyard in the middle of the night and dig up the body of a recently dead man, preferably a child, and knead flour on the corpse's chest. This, when prepared as bread and given to the victim, puts him under a spell, which can only be broken by a counter spell (field notes).

57. The idea of the putrefaction of the humours is based on the theories taught by Galen (131 A.D.). He believed that the innate injurious influences to which animal bodies are subject are comprised of the four general elements, the hot, the cold, the moist and the dry or expressed in their essences, fire, earth, air and water. The differing proportions in which these elements enter into the body gives rise to the physical and temperamental qualities distinguishing one individual from another. Health results from the perfect and harmonious admixture of those various elements, and sickness is the consequence of some disproportion of the humours called by him putrefaction. For example, according to Galen, quotidian fever is caused by the putrefaction of the mucus, tertian by that of yellow bile, and quartan by that of black bile. E.Balfour, The Vydian and the Hakim, What do they know about medicine? (Madras: Higginbotham & Co., 1875, p. 9)

58. The villagers distinguish between foods that are 'hot', i.e. that have a heat-producing effect, and foods that are cold, i.e. that have a cold-producing effect. There are also foods that are intermediate between the two. See footnotes 35 and 36.

59. The _Vydian_ physicians of India of the _Misri_ or Egyptian School of medicine never bleed, but frequently employ sulphur and metallic compounds, such as white oxide of arsenic, calomel and corrosive sublimate in the form of impure chlorides of mercury and cinnabar. Balfour, footnote 57, p. 11.

60. Pennel found that in cases of severe haemorrhage some oil was boiled and poured into the wound of the patient, after which the women sometimes sewed it up using the hairs from their head and sewing needles (Pennel, 1909, p.40).

61. An animal or even a good crop, if it incites envy, may fall victim to the evil eye, or _jinns_ or spirits can cause cattle sickness. So every heap of grain has a small verse from the Quran written by the _mullah_ stuck in it. Cattle are protected by blowing prayers on a stick and passing it over them.

62. Muslims believe in _jinns_ or spirits who at creation were made from fire without smoke. There are five kinds of _jinns_ or spirits: the _jann_ or metamorphised _jinn_ who can take the shape of man; the _pari_ or _dev_ renowned for beauty; the _shaitan_ or evil _jinn_: _Afrit_ a powerful _jinn_; and _marid_ the most powerful. It is believed that their favourite haunts are ruined wells, graveyards and other lonely and deserted tracts (Rose, 1919, p. 561).

63. Holy shrines are scattered all over the North West Frontier Province. The following shrines are famous for the cure of the diseases listed: _Nazaristan Baba_ for

the evil eye and evil spirits; Folad Baba for smallpox, chicken-pox and measles; Akon Baba and Faqir Baba for rheumatism ; Chalgazi Baba for sons; Issa Baba for boils; Khunni Baba for water in the knee; Mirzagul Baba for rashes and skin diseases; Bodla Baba for the cure of hydrophobia; Kasimi Baba for children's ailments; Nazar Bostan Baba for sick cattle. The most famous is Pir Baba of Buner; he is known to answer prayers of marriage and to perform miracles for childless couples. Barren women travel for many miles on foot to pray for sons. They usually suspend a cot under the branch of a tree near the shrine in which they leave a stone. There are also a number of smaller ziārats which are less famous (NWFP, 1931, p. 142; field notes).

64. Holy shrines have a separate entrance for men and women. The pilgrims take food and small flags as offerings. There is a boundary beyond which all visitors go bare-footed. From the shrine the supplicants take mud or a stone to rub on their bodies. They also take a bit of kodda or food offerings from the shrine that have been blessed.

65. Pennel writes that although some shrines are in inaccessible places, i.e. on a mountain or cliff, hundreds of pilgrims visit them yearly and the sick are carried up in their beds with the hope that the blessing of the saint will cure them. He believes that in some cases the change from a stuffy, unventilated, dark room to the open air has its share in the cure which undoubtedly results (Pennel, 1909, p. 34).

66. Boismeau writes that 'while illiteracy, traditional behaviour and superstition had been common among all villagers, these signs of backwardness gradually became more characteristic of the women than the men in rural communities...There is a cumulative process at work: where young men have been to school and gained at least an acquaintance with the scientific approach. While girls are only taught traditional beliefs by illiterate mothers, it is unquestionably true that it is more effective to teach modern agricultural methods to male than to female farmers'. Mlle de Boismeau, Project d'Animation Féminine Rurale dans la Préfecture de l'Ouham, République Centrale Africaine (Paris: Bureau pour le Dévelopement de la Production Agricole, 1965), p. 10. Cited by Boserup, 1970, p. 56.

67. The result of the extension services is a further widening of the gap between the labour productivity of men and women. Men are taught to apply modern methods in the cultivation of a given crop, whereas women continue with the traditional methods. Furthermore men cultivate the cash crops which are backed by government investment grants, whereas women's food crop cultivation is not given government support. In short men represent modern farming in the village and women represent the old drudgery. See P. Leurquin, Le Niveau de Vie des Populations Rurales du Ruanda-Urundi (Louvain: 1960), pp. 251-252; United Nations Commission on the Status of Women, The Role of Women in the Economic and Social Development of their Countries (New York: United Nations, 1968), p. 35. Both Cited by Boserup, 1970, pp. 55-56.

CHAPTER 4

METHODOLOGY AND RESULTS: FIELDWORK AND DATA PROCESSING

4.1 INTRODUCTION

This chapter is devoted to the methodology of fieldwork and data processing. It examines the census plan and selection; the instrument of research, the questionnaire; the organization of the fieldwork; the practical problems of fieldwork which were largely predictable taking into account the context of the study area; and finally the processing of the data.

4.2 CENSUS PLAN AND SELECTION

Small field surveys with limited resources in difficult areas present infinite problems with regard to the choice of a suitable sample method if a complete coverage of the population is not considered. If a complete coverage is adopted in order to overcome this difficulty, there still remains the problem of coverage of population in the remote and inaccessible areas. Therefore the development of a suitable method in consonance with the study objectives acquires great importance.

4.2.1 Frame

The choice of frame was determined by the availability of village lists. The most reliable and up-to-date village list available was selected.

The study was carried out in Daudzai thana or police ward in Peshawar tehsil, which is an administrative unit of Peshawar district, and in Michni tribal area attached to Peshawar district (Chapt. 3, Sec. 3.3).

A. Census list

A list of all the villages in the area and the households within the villages was requested from the Pakistan Academy for

Rural Development. The list that was obtained was based on the 1971 Population Census returns for Daudzai _thana_. It contained the names, population size and total number of households of the 89 villages and 46 hamlets of Daudzai (Pakistan, 1973, pp. 2-6). No such information was available for Michni.

This list was selected because it answered the requirements of the study. It contained sufficient information to ensure that ~~the~~ the villages selected could be identified with certainty; it also provided information on the total number of households in the village which served as a check when the household list was prepared for the study; and finally it was the most reliable and relatively up-to-date information on the area.

B. Other lists

Other lists, such as those for administrative and tax purposes or those based on other surveys, were not even considered seriously, firstly, because most of them are based on census information; secondly, because they are notoriously unreliable and contain the classic elements that constitute a bad frame, i.e. missing elements in terms of inadequacy, incompleteness and blanks (Moser and Kalton, 1971, p. 154; Kish, 1965; Yates, 1960); and finally, because they are rarely available for use for other than government purposes.

4.2.2 Study design

After considering several methods, it was decided to carry out a census or complete enumeration of the selected villages. It was considered that this was the most simple and efficient method in the present context.

A. Selection of villages

The selection of the villages was not carried out on a random basis, but according to specific criteria. These were that: the villages should represent in microcosm the social, economic, religious and cultural structure of the community, i.e. they should be as heterogeneous as possible in order to answer to the study requirements adequately; they should not be subject to excessive migration or immigration which would create a bias; they should not be too remote in view of the limited facilities of staying overnight in the villages; and finally they should be small so that it would be easier to prepare the list of households which was necessary since no official list was available. Moreover, size would be a determining factor in simplifying the task of collecting the respondents.

After a preliminary study of the area which consisted of a study of official records and other literature, visits for observation purposes to the villages of Daudzai thana and Michni tribal area, discussion with research teams in the area and village lambardars or headmen, it was decided to select the 22 villages listed in Table 4.1.

B. Other sampling methods considered

In search of a suitable design for the study, consideration was given to several other methods which included a simple random sample of clusters and a systematic sample of the area.

Simple random sample of clusters: This method would have consisted in numbering the villages serially from 1 to 89 and then with a table of random numbers the required number of villages would have been selected randomly. This method would have given an equal chance of selection to all the villages (Armitage, 1971, pp. 83-84: Moser and Kalton, 1971, pp. 80-82). But it was abandoned because of the possibility of the selection of unsuitable villages, i.e. those that did not fulfil the selection criteria, or the selection of a scattered sample.

Systematic sample of clusters: An alternative method considered was to number all the 89 villages of Daudzai on a large map. In this method all the names of the villages are copied down from the map on to a sheet of paper, working systematically from top to bottom and then backwards from bottom to top in the direction of east to west. Once the villages are arranged systematically they are numbered serially, in this case from 1 to 89. The first number is selected at random and then the subsequent villages are selected systematically based on the sampling fraction, k=N/n, where N represents the total number of villages in the area and n the number to be selected in the study (Moser and Kalton, 1971, p. 83).

Although this method has the advantage of providing an adequate geographic coverage of the area, it was not suitable for a variety of reasons, some of which have already been mentioned in connection with the simple random sample of clusters. Furthermore, the size of the villages in the area vary from 27 households to 500+, and an even geographic distribution would not have been possible given the size of the study and was not relevant in the present context.

Other method : Another method reviewed was a combination of the two above methods, and would have consisted in grouping the villages into clusters evenly distributed over the area and from each of these clusters selecting a village at random (Asraf, 1962, p.5)

All the designs reviewed above were rejected as inadequate for the requirements of the study.

4.2.3 Study size

The three factors that must be taken into account when determining the size of the study are the degree of precision required, the degree of precision expected and the funds available.

A. Precision

Most studies take into account the precision required in terms of geographic detail needed, other breakdowns, precision of existing studies, the precision expected of the data collection process , . the variation from year to year of the characteristics investigated and the precision requirements of the study (U.N., 1974, pp. 104-112).

It was obvious from the outset that a preparatory study of this type which had to be carried out among a predominantly illiterate rural population would be subject to innumerable errors both on the part of enumerators and respondents, i.e. when the former misrecords information or the latter gives an incorrect answer through carelessness, misunderstanding or a desire to conceal the truth (Moser and Kalton, 1971, pp. 378-387). Furthermore, it had no similar study to use as a criterion to judge precision and with analysis only the minimum breakdowns in the results were required. Therefore the determination of the size of the study did not have to be calculated with the same mathematical precision as is usual in large studies.

B. Size

Most African demographic surveys using retrospective methods have consisted of sample sizes between 100,000 and 200,000 persons in order to achieve reasonable accuracy (U.N., 1974, p. 109). However, it was not possible to undertake such a large scale study for reasons given below. The size was limited by the budget, the time available and above all by the fact that it was a one-man study to be conducted in difficult areas; furthermore, the questionnaire included several socio-economic variables which do not require such large sample sizes as do surveys that are purely demographic.

After discussions with Professor Brass in which the above factors were taken into account, it was decided that the study size should consist of 2,000 households, the minimum size in order to obtain reasonable results.

4.3 QUESTIONNAIRE

A complete census of the population in the 22 selected villages was carried out by enumerators through formal interviews based on a structured questionnaire which had previously been prepared at LSHTM. It consisted of five sections and was pre-tested in a pilot study which preceded the main census (See Appendix 5).

4.3.1 Household characteristics

The data from this section of the questionnaire contributed towards Chapter 3 on background to the area. It contained questions on the following variables.

A. Tribe

The membership of the household to a kaum or tribe, zai or subtribe and khel or clan.

B. Structure and occupancy status

This included questions on building type, i.e. kucha or mud and pukka or cement; ventilation; date of construction, source of water supply; and electricity facilities. Occupancy information was in terms of whether the occupants of the households were owners, tenants, i.e. rent or rent-free, and similar questions with regard to their landholdings were solicited.

C. Economic status

Economic status was defined in terms of the ownership of modern objects; yearly production of crops by type of crop; ownership of livestock; and income, expenditure and credit. The latter information was elaborated to include source and purpose of credit.

4.3.2 Basic demographic characteristics

This section recorded the basic demographic characteristics and the definition of terms were carefully considered.

A. Total population

At the preparatory stage it had been decided to carry out a comprehensive enumeration. This method is a combination of the de facto and de jure methods.

De facto enumeration: The population is defined as all persons in the area where they are physically found on the date of the census. This method has not only the advantage of simplicity in terms of the definition but also in terms of instructions to enumerators. However, if the enumeration is spread over a long time period, it can create distortions and double counting (Ibid., p. 28).

De jure enumeration: In this case the population is defined as the persons who usually reside in the area. This involves more complicated definitions, i.e. residence in terms of membership of the household and conditions for residence in terms of duration of stay, as well as careful instructions to enumerators to ensure complete and consistent reporting (Ibid., pp. 6-8; pp. 29-30).

Comprehensive enumeration: This overcomes the problems of either of the above methods applied separately, because the population definition includes all those present on the reference night as well as those who are resident. A column in the questionnaire includes information to indicate whether or not a person is a usual resident or not.

In practice, however, the experience of the pilot study showed that it was necessary to apply the de jure concept, and residence was defined as the membership of the household. All kuchi or nomadic migrants were excluded unless they had become permanent settlers in the village.

B. Household and head

The household[1] was defined as a group of people who pool their incomes and cook and eat together. This definition included the family head, his dependants, relatives and servants. Persons who had temporarily gone elsewhere to work or for other purposes, but were normal residents of the household, were also included.

In most cases the head of the household was listed first and the relationship of the other members to the head followed, i.e. wife, son, daughter, daughter-in-law, grandson etc.

C. Sex and age

Information was asked on both sex and age. The former question usually poses no problems. However, it is well known that this is not the case with the latter in areas where there is no compulsory registration of births and deaths. There are two methods of formulating the question: the date-of-birth method, and the age-at-last-birthday method.

The date-of-birth method: This is considered more precise because it consists of recording the exact age of the person in years, months and days. In practice, however, in developing countries answers to the questions on the date-of-birth are incomplete or incorrect for the reasons stated above. There is the further disadvantage of a need for the computation of ages either during enumeration or during the coding or tabulation process.

The age-at-last-birthday method: This records the exact or approximate completed years for persons over one year of age. For infants under two years the age is given in completed months. It is considered less accurate than the first method but has the advantage of being simple not only in terms of the question itself but also in terms of computation (Ibid., pp.38-41).

Dual method: This relies on a combination of both methods and was used for the study purposes. However, in practice respondents almost always stated their age in completed years or at the last birthday.

Age estimation: When no documents are available to indicate the ages of the respondents, as was the case among almost all the population, the enumerators sometimes

TABLE 4.1

LIST OF SELECTED VILLAGES BY POPULATION AND HOUSEHOLDS, 1971

NAME OF VILLAGE	Area	Population			Households
	Acres	Male	Female	Total	Total
1. Bela Mohmandan	1488	512	501	1013	153
2. Jogani	383	92	68	160	29
3. Sarkhana	548	578	578	1156	177
4. Piari Payan	439	217	174	391	62
5. Piari Bala	351	188	187	375	51
6. Wazir Kali	621	431	420	851	124
7. Shahgali Bala	519	398	386	784	110
8. Shahgali Payan	585	166	159	325	47
9. Dang Lakhta	619	171	131	302	58
10. Nilavi	933	359	339	698	87
11. Sher Kali	219	213	203	416	67
12. Zormandi 1[1]	1960	538	518	1056	174
13. Ghari Sharif Khan	378	350	371	721	104
14. Gidar	456	79	86	165	32
15. Khwaji	387	172	140	312	46
16. Kila Shah Beg	1815	1064	1091	2155	265
17. Dheri Kali	546	466	407	873	147
18. Karyana	185	200	204	404	62
19. Zormandi 2	287	143	134	277	37
20. Bhattian	253	442	449	891	147
21. Ghari Hamza	274	159	132	291	46
22. Michni (tribal area).	No figures available.				
TOTAL	13246	6936	6678	13614	2025

Source: Census of Pakistan, 1971

1. The whole village was washed away some years ago by floods and the inhabitants settled in other villages. Therefore the figures of the study did not correspond with those of the Pakistan census.

TABLE 4.2

DISTANCE, DIRECTION AND ACCESS TO VILLAGES

Village	Distance from Peshawar or village	Direction	Access
1. Bela Mohmandan	25 miles	NW of Peshawar	Jeep &Boat
2. Jogani	17 "	NW " "	"
3. Sarkhana	1 " from Jogani	East of Jogani	On foot
4. Piari Payan	2 " " "	NW "	"
5. Piara Bala	2 " " "	West "	"
6. Wazir Kali	2½ " " "	West "	"
7. Shahgali Bala	1½ " " "	West "	"
8. Shahgali Payan	1 " " "	West "	"
9. Dang Lakhta	½ " " "	East "	"
10. Nilavi	25 " " "	North "	"
11. Zormandi 1	15 " from Peshawar	NW of Peshawar	Jeep
12. Sher Kali	15 " " "	West "	Jeep&foot
13. Garhi Sharif Khan	16 " " "	East "	Jeep
14. Gidar	15 " " "	SE "	Jeep& Boat
15. Khwaji	27 " " "	SE "	"
16. Kila Shah Beg	18 " " "	NW "	Jeep
17. Dheri Kali	17 " " "	West "	"
18. Karyana	9 " " "	SE "	"
19. Zormandi 2	11 " " "	East "	"
20. Bhattian	10 " " "	SE "	"
21. Ghari Hamza	28	E "	"
22. Michni		NW "	"

had to estimate the ages of the people with their help by the use of historical events, tribal age ceremonies and in relation to the age of other persons in the household or the community.

Historical events that are landmarks in the country's history, i.e. Partition of the Indian Subcontinent, war etc., were rarely used in age estimation. On the other hand, although there are no formal 'age grades' or 'age sets' as in Africa, the rites de passage play an important role in the life of the individual and were often used in cases of doubt. For example, in the case of women, parity and duration of marriage sometimes helped in age determination, whereas for male children school attendance and sunnat or circumcision references were used.[2] Ages of respondents relative to other members of the community or household were also important.

Enumerators were asked to spare no efforts at arriving at the best possible estimate in cases of doubt in order to achieve the maximum accuracy given the circumstances. In most instances it was not necessary to resort to estimation as most respondents, especially males, were able to state an approximate age at their last birthday without hesitation. Whether it was the accurate age will be discussed later (Chapt. 5, Sec. 5.2).

D. Birthplace and marital status

Birthplace definition was straightforward and was asked, not for the purpose of studying ethnic groups or migration, but as a means of assessing the quality of data (Chapt. 5, Sec. 5.2; U.N., 1948c, pp. 5-6).

In an Islamic society like Pakistan there are no de facto unions and marriage is a formal contract. However, it was important to distinguish between betrothal and marriage. Therefore marriage was defined as wāde or the ceremonial removal of the woman from her natal home after the celebration of nikah or marriage vows. Kohizdena or betrothal ceremony, which is considered the first marriage and is sometimes celebrated when the couple is still young, was excluded from the definition (Chapt. 3, Sec. 3.6.2.C).

If the respondent was married, further information was sought on duration of marriage and present marital status. This included the five conventional classifications which are comprehensive and take into account all the matrimonial relationships prevalent in the society and were defined as follows: married, a person who is married at the time of the study and whose spouse is living; widowed, a person who was married but whose spouse has died; divorced, a person who was married but whose marriage was legally dissolved; separated, a person who was married but whose marriage has not been legally dissolved (U.N., 1949a, pp. 21-22).

4.3.3 Fertility and mortality

The questions on fertility can be divided into those concerned with current fertility, or births occurring in a specified period prior to the study, and those concerned with lifetime fertility, or the total number of children ever born to women in the study. Data was collected on both current and lifetime fertility from all ever-married women. No upper age limit was specified.

A. Fertility

Current fertility: This data can be obtained through questions on births in the preceding twelve months or the date of the last live birth. The second method was used and women were asked the date of their last birth. The answer was recorded in completed years when the births referred to ages over one or two years, i.e. three years ago, four years ago etc., and in months if the births had occurred in the 12 or 24 month period preceding the enumeration.

This method is considered to have several advantages over the births in the preceding twelve months' approach. Among these are the elimination of errors associated with a low incidence of events[3]; the distribution of women bearing children between 12-24 months provides supplementary data on the shape of the age-specific fertility curve; and finally the age of the last child is a means of checking the mother's age which may either be stated too high or too low (U.N., 1974, p. 45).

Lifetime fertility: This data can either be obtained through the pregnancy history questionnaire or the number of children ever born to women. The latter method is more commonly used by census surveys because, unlike pregnancy or maternity histories, it does not involve a separate questionnaire for each female respondent. Furthermore, it is free from dating errors since there is no reference period (Ibid., p. 49).

Data was obtained on total number of live births by sex of child.

B. Mortality

As in the case of fertility, investigations into mortality may be divided into two categories: those concerned with current mortality, i.e. deaths occurring in the household during a specified recent period, usually the preceding 12 months; or those concerned with retrospective mortality, i.e. deaths which involve no dating or reference period. The latter method was used for infant and adult mortality.

Retrospective mortality investigation has the advantage over the current mortality investigation in that it involves no reference period and is therefore not subject to dating errors; the questions are simple; it includes a large number of persons and is not only restricted to those households that have experienced a death in a recent specified period; and finally it is less cumbersome to punch, code and tabulate (Ibid., pp. 50-51).

Infant mortality: Information on lifetime fertility obtained from women by sex of the child was further divided into the number of children ever born who are still alive; and the number of children born alive now dead. Cause of death was recorded for the first two deaths.

Adult mortality: This included questions on the survival of the respondents' biological parents, i.e. orphanhood status; survival of first spouse, i.e. widowhood status; and survival of siblings both real and step, i.e. sibling status. For orphanhood and widowhood cause of death was recorded.

4.3.4. Education and occupation

Data on both education and occupation status of the population were acquired.

A. Education

In view of the fact that the majority of the rural population is illiterate, literacy was defined, as in the Pakistan Census, as the ability to read and write a simple message. Educational level was assessed by the number of years of school attendance. No minimum age limit was specified for the question (U.N., 1949b, p. 8).

B. Occupation

Occupation was defined as the activity from which the person derived the major part of his total income. Housework done by members of the family in their own homes was not included in the description, but work done by members of a family as part of their occupation, although not directly remunerated, was included (U.N., 1948a, p. 14). In cases of more than one occupation, the answers were recorded according to the importance of the occupation, and during the coding process only the first occupation was listed.

Occupation was grouped into two main classes: the agricultural and the non-agricultural. The former category included landowners, i.e. owner-non-cultivator, owner-cultivator, tenant-farmer and wage-labourer . The latter category included government servants, artisans and other occupational groups. Women and children who are mainly employed in household occupations were excluded (U.N., 1948b, p. 5).

4.3.5 Health, family planning and pregnancy

This section consisted of questions on health, family planning and pregnancy care.

A. Health

Health was defined in terms of illness, treatment sought for the illness, cost of treatment, and incidence of tuberculosis and prevalence of vaccination.

Illness: Illness was defined as any condition, marked by a pronounced deviation from the normal healthy state, which reduces a person's capacity to do his daily duties, or any condition for which a person would normally decide to seek some form of relief.[4] The nature of the last illness was recorded according to the statement of the respondent. This was either based on diagnosis by the individual, doctor, local compounder or indigenous practitioner.

Treatment and cost: The answers on treatment anticipated were indicated as either did nothing or sought treatment by traditional healer, hospital, health centre or other source to be specified. The cost was recorded in rupees.

Tuberculosis and vaccination: Questions were also asked on whether the individual had ever suffered from tuberculosis and whether he had ever been vaccinated.

B. Family planning

Married couples were asked three specific questions : whether they knew about family planning; whether they practised it; and, if so, the source of contraceptives.

C. Pregnancy practices

Data was collected on place of last birth, attendance at last birth and breastfeeding practices.

4.4 FIELDWORK

It had originally been intended to carry out this research project through the Pakistan Academy for Rural Development (PARD). However, as a result of various changes that occurred in the administration of the Institute, this did not prove possible. It was therefore decided to set up an independent organization for the project with its headquarters in Peshawar. The staff for the project consisted of the author, a consultant who had previously been manager of the Daudzai project (Chapt. 3, Sec. 3.7), a full-time interviewer, several part-time interviewers from PARD, a dai or trained midwife and a driver. Transport was provided on a long term basis by the Ministry of Health and on a short term basis by the Directorate of Rural Development.

4.4.1 Recruitment and training of interviewers

In studies where all the data are collected by the completion of questionnaires in household interview censuses, the interviewer plays a central role in the data collection process. Therefore their selection and training assumes great importance to meet the aims of the project.

A. Selection of interviewers

Before undertaking the census both the research staff at PARD and the Ministry of Health were contacted. It was hoped to arrange for the recruitment of male research staff on a part-time basis from the former and lady health visitors (LHV s) who had completed their training and were awaiting employment from the latter.

The Ministry of Health extended immediate cooperation by drawing up a list of the names and addresses of the LHVs who had recently qualified. Several of them were contacted. However, it was not possible to recruit educated females for work in rural areas inspite of an offer of an attractive remuneration. Therefore it was decided to hire the services of an elderly dai. With regard to male enumerators there was no shortage of applicants.

The minimum requirements for recruitment were that the interviewers should be intelligent and patient in interviewing; that they should be willing to work long hours in remote places; and that they should be able to communicate with the rural population. Several of the applicants were judged by interviews and in the field to test for the above requirements and were found unsuitable. It was therefore decided to recruit a B.A. student on a higher salary than originally planned and also employ the services of two or three part-time researchers from PARD.

B. Training of interviewers

The training of interviewers was arranged in two parts, theoretical training and practical training.

Theoretical training: This consisted in the distribution of the questionnaire among the enumerators to be studied and an introductory talk on the aims of the project. The talk was followed by an informal discussion which included an examination of the variables of the questionnaire, the definition of terms and concepts, and the methods of recording responses. It was emphasized that, at all times, enumerators should aim to record responses correctly and accurately, to avoid influencing respondents, to complete all the variables in the questionnaire, and finally to display courtesy and patience in their dealings with all villagers.

Practical training: This was the most important part of the training and took place in the field. It proved an extremely valuable experience in that it brought to the fore several questions that had been theoretically understood by the enumerators but were found difficult in practice. These problems were discussed and clarified, and the points already raised in the theoretical part of the training were re-emphasized. However, on the whole, the enumerators and the part-time researchers were already qualified in this field of research and were able to maintain relatively high standards.

4.4.2 Pilot study

The pilot study was not designed to estimate the best possible size, given the requirements of the project, nor was it aimed to test for coding and programming etc.

A. Purpose of the pilot study

The main purpose of the pilot study was to: test the clarity, accuracy and suitability of the questionnaire for the study population, so that the appropriate modifications could be introduced, if the need should arise, before the commencement of the census; to provide a practical training course for the enumerators, so that any remaining misconceptions and misinterpretations should be clarified; to judge their rate and ability of work; and to standardize procedures to be adopted by them; to underline any shortcomings in the team's approach to fieldwork so that they could be rectified. In short, the pilot study was to provide a test of all the census procedures adopted in the study.

B. Conduct of the pilot study

Once the date for the pilot study had been fixed, all the necessary equipment for the study was ordered. This included questionnaires, stationary, i.e. pencils, rubbers, sharpeners etc. However, time schedules had to be abandoned because of the delay in the arrangement of transport. Therefore the pilot study began in February with the arrival of transport from the Directorate of Rural Development.

The pilot enumeration was conducted in the village of Bela Mohmandan (Table 4.1), a village situated to the north west of Peshawar city at a distance of about 25 miles. The approach to the village is by jeep (Table 4.2). The village comprises 153 households. The target for the pilot study was 50 households.

Progress in the initial stages was slow for a number of reasons, among which were that transport had not yet been provided on a full-time basis by the Ministry of Health and therefore it was only possible to go in the afternoons. Furthermore, time was being wasted due to a lack of an organized approach to fieldwork, and finally the enumerators had not become fully acquainted with the questionnaire.

C. Experience from the pilot study

During the pilot study a total of 50 households were interviewed. The questions were asked in Pushtu and recorded in English. In general the respondents had no difficulty in understanding the questions.

Testing for clarity and suitability: After the completion of the pilot study, the questionnaires were edited and the difficulties encountered by the enumerators were discussed and, in the light of this experience, certain minor modifications were introduced.

The modifications involved the <u>inclusion</u> and <u>exclusion</u> of certain questions, but these did not impinge on the major demographic health or family planning questions. In the former case, they were related to tribe which was extended to include subtribe of the household; livestock ownership; and source and purpose of credit. It was found that people automatically provided this information and it was therefore included in a formal manner in the questionnaire. With regard to the latter, the question on serious illness episode in the last year was found to overlap with the question on the nature of the last illness. Finally, the questions on nutrition, which were: 'Do males and females eat together? If not who eats first? In case of a food shortage how is the food distributed?' were completely dropped. This was because, according to the customs of the society, men and women eat separately, the men being served first (Chapt. 3. Sec. 3.4.1.C), and because, for some inexplicable reason, people resented being questioned about food distribution in times of shortage.

Another modification was the <u>redefinition of the concept</u> of total population. The enumerators had originally been instructed to enumerate both the <u>de facto</u> and the <u>de jure</u> population of the household, i.e. a comprehensive enumeration. However, the <u>de facto</u> concept did not correspond to the way of thinking of the respondents. In listing the population of the household they only included the <u>de jure</u> population, i.e. the head of household only gave the names of those persons who formed part of his household, such as his dependants, relatives and servants, and those temporarily absent, but who were part of the household. Furthermore, the manner in which the interviews were conducted (Chapt.4, Sec. 4.4.3.C) reemphasized the need for a de jure enumeration.

Ability and rate of work of the interviewers: The pilot study provided the final opportunity before the census to observe the enumerators' working abilities under field conditions. On the whole the operation proceeded smoothly. However, the pilot census was not suitable as a means of testing the enumerators' rate of work. for the reasons listed above (Chapter 4, Sec. 4.4.2.B). At the beginning the team was exceptionally slow and did not manage to complete more than three to four questionnaires per person per day, depending upon the family size. The rate of work changed drastically as the study proceeded and the interviewers adapted to the questionnaire and the procedures of work.

Method of fieldwork: During the pilot study the male enumerators interviewed the heads of households in the hujra or guesthouse, while the females, that is to say the author and the dai or midwife, made house to house visits interviewing the females. This sometimes led to repetition, i.e. the same household was interviewed twice. It was therefore decided to prepare a formal list of heads of households for each village so that each interviewer could be systematically allocated a certain number of households in the village (Appendix 6).

4.4.3 Data Collection

The census enumeration in the study villages began at the end of February 1976 and lasted about a year.

A. Method of Work

Every day the interviewers were conveyed from Peshawar to the study village by jeep (Table 4.2). Interviewing started early in the morning and lasted until the evening. The team worked together in one village for several days or weeks until all the households had been covered. The work was supervized at all times by the author and the consultant.

When the enumeration of the remoter villages was being carried out, it was decided to spend the nights in the village in order to avoid the time wasted in travel, i.e. sometimes more than three hours. However this proved disadvantageous both in terms of time and the study. It was not possible to make up for wasted time by working late into the evening because the villages have no electricity and they retire to bed a few hours after sunset. Furthermore, there was the danger of the study becoming associated with the hosts so that hostile factions in the village would be uncooperative. Therefore, in order to maintain the neutrality of the project from local rivalries, it was decided to suffer the inconvenience of travel and return to Peshawar each evening.

B. Informing the people

Prior to undertaking the enumeration in any area, the procedure was to contact the village headman or other elders either individually or collectively to make the necessary arrangements. These included explaining the purpose of the study, the date of the enumeration, the time of arrival of the interviewers in that particular village and the people who were expected to be interviewed. They were then asked to inform all the members of the village. The team also used the services of a contactman, usually the village headman, who acted as the guide and organized the gathering of the household heads.

C. Conduct of interviews

A set procedure was adopted by the team for the conduct of interviews in each village.

List of households: The first priority upon arrival in each village was to prepare a list of households. This was done by the consultant in collaboration with the village headman, elders or some other local authority. Each household was represented on the list by the full name of the head of household, i.e. the senior male member (Chapt.3, Sec. 3.4.1.B; Appendix 6). In the case of a hamlet a similar list was drawn up. The total number of households on the list was then checked against the total number given for that particular village in the 1971 Census. If there were large discrepancies other members were consulted to ensure that no household had been omitted from the list. In almost all cases the figures tallied, with the exception of one village. The reason for this was that between the 1971 Census and the present study a part of the village had been washed away by flood and the inhabitants had settled in the neighbouring hamlets. Therefore the total number of households was not traceable, i.e. the number of households on the list did not correspond to that of the Census (Table 4.1).

Contacting the people: From the final list a certain number of households were allocated to the author and the dai. These had to be visited each in turn and the females of the household were interviewed. For cultural reasons it was not possible - for the male staff to conduct a house to house census (Chapt. 3, Sec. 3.4.1.C). In seasons of low agricultural activity all the heads of households were readily available and congregated in the village hujra or guesthouse and also in the mosque, both of which are usually situated on the outskirts of the village (Chapt. 3, Sec. 3.3.1). Sometimes, however, it was necessary for the interviewers to seek out the respondents in the fields or the ghor ghani or cane crusher. Only in Michni tribal area was there a real problem of scattered dwellings.

Interviews: In the house to house enumeration the eldest female member answered the questions for her whole family with the assistance of another female relative or her husband. In the case of men the head of the household answered for all the members of his family.

The principal advantage of the male interviewers' method was that it was fast and easy. The interviewers sat with the respondents in a separate corner of the guesthouse or its courtyard, and conducted the interviews at some distance from the other respondents who were waiting to be interviewed. Although this did not allow complete privacy, it enabled the respondent, when in doubt, to cross-check information with other members of the ward or brotherhood, especially in relation to factual questions on age, births and deaths (Chapt. 3, Sec. 3.6). However, this lack of complete privacy did create some problems with regard to attitudinal and hypothetical questions which would have posed problems anyway.

The female interviewers, on the other hand, had to move from house to house. This not only wasted time because of the physical displacement involved, but the preliminary courtesy ritual had to be repeated and the purpose of the study explained on arrival at each household. Furthermore, it was not possible to interview the women separately. Other women and children from the neighbourhood gathered to create a distraction. Women, in the majority of cases, are ignorant, and interviews only proceeded smoothly if the head of household was present (Chapt. 3, Sec. 3.7, footnote 66). It was therefore decided, in the course of the fieldwork, for the author and the <u>dai</u> to interview the heads of households.

<u>Questions</u>: All the questions were asked in Pushtu and recorded in English. No interviews were ever abandoned for lack of understanding or communication between the interviewers and the respondents. In cases where the respondents were hesitant to provide answers to certain questions, patience and tact were shown to win over the confidence of the respondent, or when the respondent was elderly or deaf, a younger educated son or relative either served as interpreter or provided the information.

<u>D. Non-response</u>

There are two types of non-respondents. The first category includes those who could not be contacted because they were absent from the village at the time of the census, and the second category includes those who refused to be interviewed. In the former case the females of the household, or some relative or neighbour, was able to provide the information. This was always checked with the absent member if he returned during the team's work in the village. The latter type of non-response was only encountered very rarely, i.e. one or two cases in Michni tribal area, and was not experienced in the settled areas. This is not to say that people were not hesitant with regard to certain questions, i.e. income and landholdings, but once they had been reassured that the study had no government connection and was not designed for taxation purposes they were willing to extend their full cooperation.

E. Cooperation

The 100% response rate and cooperation extended to the project by the population of the study villages was primarily due to the consultant. He was well known and respected in the area and had served the people through the Daudzai project; many of them had benefited directly from it (Chapt. 3, Sec. 3.7.2) and were therefore willing to offer every courtesy and cooperation to the team. Furthermore, according to the Pathan code of honour, guests are treated with respect and hospitality (Chapt.3, footnote 10).

It could be argued that the consultant's close association with the villagers could have introduced a bias in the study, in that the respondents might have been encouraged to give the responses which they supposed would please the interviewers. However, this was not the case, as no effort was spared in informing the respondents that their cooperation would be appreciated in terms of answering the questions as accurately as possible to their knowledge.

4.4.4 Precautions to minimize errors

In the light of all the errors that are inherent in household censuses, a number of precautions were taken in the preparation and execution of the study to minimize errors These precautions were in terms of the questionnaire, interviewers, data collection, and supervision.

A. Questionnaire

The design of the questionnaire was in the simple census format and was easy to handle; the majority of the questions were factual and easy to understand and required straightforward 'yes' or 'no' answers (Appendix 5); and finally the questionnaire was tested by a pilot study and the necessary modifications were introduced in order to suit local requirements (Chapt. 4, Sec. 4.2.C).

B. Interviewers

The team of interviewers consisted of a small group of three full-time and three part-time members who, for the most part, were highly qualified and had previous practical experience in the field. They were given adequate theoretical and practical training and were themselves able to bring important problems to light both in terms of the fieldwork procedure and the questionnaire (Chapt. 4, Sec. 4.4.1).

C. Data collection

Respondents were always given adequate notification prior to the arrival of the interviewers to their village. The notification was done through the traditional authorities of the area. The people were always approached politely and local conventions were observed as much as possible. For example, the interviews by the men were conducted in the hujra or guesthouse or the mosque and not through house to house interviews. People were never rushed during an interview and their pace was followed, even though this sometimes meant an hour or more to interview a large family. Finally all respondents were heads of households or some other responsible person. If information was collected on a household in the absence of the head, and he returned during the team's work in the village, the information was checked with him (Chapt. 4, Sec. 4.4.3).

D. Supervision

The author and the consultant were directly involved in the arrangements for fieldwork, i.e. contacting traditional leaders, making a list of the households in the village etc., the interviewing and the supervision. Furthermore, the completed questionnaires were checked for accuracy and completeness; and the questionnaire and other fieldwork equipment was kept in ready supply (Ibid.).

4.5 PRACTICAL PROBLEMS OF FIELDWORK

It is well known that illiteracy and poor statistical awareness are the common difficulties met with when conducting censuses in developing countries. However, in addition to these, there were specific problems peculiar to the area.

4.5.1 Questionnaire

The main problems that arose in the questionnaire were in connection with names of females, non-factual questions, and the length of the questionnaire.

Names: The author and the dai had no trouble in obtaining the names of all the female members of the household. On the other hand, the male interviewers were never given the names of the females of the household and had to be content with listing woman 1, woman 2, girl 1, girl 2 etc. (Chapt. 3, Sec. 3.4.1.C). In spite of this, every effort was made to ensure that females were not underenumerated, especially young unmarried girls.

Non-factual questions: It was found that the respondents did not hesitate to answer factual questions, but it was more difficult to obtain answers to non-factual questions. It was therefore decided to avoid them if possible (Appendix 5, quest. 19, 20).

Length: The questions were simple to answer and, in the majority of cases, the length of the questionnaire did not matter. However, in families of more than twenty members it became tiresome for one person to provide all the information. In this respect it would have been advisable to have had a shorter questionnaire. But this was not possible because the small size of the study made it necessary to include questions on subjects other than those that were purely demographic in case the demographic results obtained were not reasonable for analysis purposes.

4.5.2 Data collection

The data collection problems involved the method of interviewing and the availability of respondents.

Men: The structure of the village and local customs (Chapt. 3, Sec. 3.3.1) did not permit the male interviewers to conduct a house to house census. All the males were interviewed in the hujra or some other suitable place. Therefore, in the majority of cases, data was obtained from one individual without seeing the other members of the family. Husbands not only had to provide information on their wives' and children's ages but also on deaths that had occurred in the natal home of the wife.

A further problem connected with the cultural environment was that the congregation of the heads of households in the guesthouse did not allow for complete privacy. Even though respondents showed no hesitation in talking about personal matters in front of other villagers, because most of the information was known by the neighbours anyway (Chapt. 3, Sec. 3.6), every effort was made to separate the respondent from the others during the interview and to maintain as much privacy as the situation allowed.

Women: It would seem that interviewing women in their households would help to overcome some of the problems listed above. This was not possible because of the reasons already given (Chapt. 4, Sec. 4.4.3.C). Furthermore, women are illiterate, not only in terms of education but also in terms of their contact with the outside world (Chapt. 3, Sec. 3.4.1.C; footnote 66). Therefore, while interviewing women, every question had to be repeated several times to make them understand. Without the presence of the head of household or the elderly dai, it was difficult to obtain their cooperation. Unlike the men, who once they had understood that the study had no government connection, were willing to answer all the questions to the best of their knowledge, the women had to have the purpose of each question explained to them and their answers were never accurate or to the point. Their husbands or elder sons always had to be asked to assist in providing the information.

Availability of respondents: It was not possible to interview the villagers during certain months of the year.

In July the farmers were not available because of the rabi or wheat crop harvesting and threshing (Chapt. 3, Sec. 3.5.3); rains and floods in August not only made the villages inaccessible but after the floods the villagers were busy repairing the damage; and finally in September, during

Ramazan or fasting, it was difficult for the interviewers to keep up targets.

4.5.3 Interviewers

It was not possible to employ the services of educated female interviewers to work in the rural areas (Chapt. 4, Sec. 4.4.1.A). However, this initial handicap turned to our advantage for several reasons. Among these were that LHVs would have encountered the same problems experienced by the author in interviewing the elderly women, but unlike the author they would not have been able to work in the hujra or guesthouse which is reserved for men only. To transport the female interviewers to the study area with the male interviewers in one jeep would not have been possible because of the pardah system. Finally several young female workers would have created negative talk in the village which would have been detrimental to the study.

4.5.4 Transport

Transport was one of the greatest problems encountered in the fieldwork because most of the selected villages are not approachable by public transport. The study was therefore dependent on the Ministry of Health and the Directorate of Rural Development. Although these Ministries extended their cooperation to the best of their abilities, emergencies, such as floods, made it necessary for them to withdraw the transport arrangements. Therefore for several months the study was brought to a complete standstill because of a lack of transport facilities.

4.6 DATA PROCESSING

All the completed questionnaires were checked, edited and numbered serially from 1 to 2070. The questionnaires from each of the villages were tied up in a separate bundle. During the period of slack interviewing dummy tables were drawn up and the data was tabulated by hand. All the completed questionnaires and hand-tabulated data were air-freighted to London for analysis at the LSHTM. After a preliminary examination of the data it was decided by Professor Brass that it should be processed by the computer.

4.6.1 Coding and punching

A census coding schedule was drawn up (Appendix 7) and the data was coded on coding sheets. These were verified for incorrect codes, i.e. a number which has not been used as a code for a specific variable but nonetheless appears; and inconsistencies, i.e. cases where one piece of information in a person's record is inconsistent with some other piece in the same record. The data on the verified coded forms was punched on 80-column cards. Each household was allotted a General card which related to the socio-economic characteristics of the household; and a separate Individual card which related to the demographic, health and family planning data for each member of the household. There was a total of over 14,000 cards in eight boxes. The processing of the data fell into three stages.

4.6.2 Editing

The editing consisted in obtaining the error output, applying the corrections and transferring the data to tape.

A. Error output

Each box contained about 2,000 cards that were first put on the permanent file on the computer, after which the 'Conker' and the 'Serial duplication' programme were applied to them. The former checked for invalid or incorrect codes and inconsistencies, whereas the latter checked for duplicate serial numbers (Appendix 8).

In most cases the errors were the result of miscoding or mispunching. The errors were usually verified against the coding forms and in some cases against the original questionnaire.

When the questionnaire itself showed an inconsistency, i.e. age at marriage of 6 or 7 years, no corrections were made.

B. Altape corrections

The errors were corrected by the 'Altape' method, which involved punching the correct code in the appropriate column together with the serial number of the card. The cards were then attached to the relevant package programme and fed into the computer. Once the corrections had been carried out, the 'Gonker' and 'Serial' programme were reapplied to ensure that no errors had been omitted.

C. Transfer to magnetic tape

The data were then transferred from permanent file on to magnetic tape. Another box was then fed into the permanent file and underwent the same process. In this manner all the nine boxes were corrected and transferred to tape. The General and Individual data of each household were then merged and put on the Hierarchical Data System.

4.6.3 Tabulation programme

The multi-tab package programme was applied to the data to obtain the following tables for analysis.

A. Household characteristics

1. Households by tribe, subtribe and clan.
2. Households by economic category.
3. Households by number of persons.
4. Households by number of rooms.
5. Households by number of beds.
6. Households by type.
7. Households by source of drinking water.
8. Households by ownership status.
9. Households by ownership of modern objects.

10. Households by landholding.
11. Households by agricultural products.
12. Households by ownership of livestock.
13. Households by income.
14. Households by expenditure.
15. Households by credit.
16. Households by source of credit.
17. Households by purpose of credit.
18. Households by family type.
19. Households by polygamy status.

B. Demographic characteristics

1. Population by sex, five-year age groups.
2. Population by sex, five-year age groups and birthplace.
3. Population by sex, five-year age groups and marital status.
4. Population by sex, five-year age groups and present marital status.
5. Population by sex, five-year age groups and times married.
6. Population by sex, five-year age groups and survival of first spouse.
7. Population by sex, five-year age groups and cause of death of first spouse.
8. Population by five-year age groups and survival of parents.
9. Population by five-year age groups and cause of death of parents.
10. Population by five-year age groups and survival of siblings.
11. Married women by five-year age groups and survival of children ever born by sex of child.
12. Married women by five-year age groups and month of last birth.

13. Married women by five-year age groups and cause of death of children ever born.
14. Married women by five-year age groups and cause of death of last child.
15. Population by sex, five-year age groups and age at first marriage for all ever married.
16. Population by sex, five-year age groups and age at first marriage for those currently married.
17. Population by sex, five-year age groups and age at first marriage for those married once only.
18. Population by sex, five-year age groups and literacy status.
19. Population by sex, five-year age groups and years of school attendance.
20. Male population by occupation status.

C. Health, family planning and pregnancy practices

In the section on health the data was broken down into six broad age groups representing infants, pre-school children, school children, youths and young adults, adults and the middle and older ages (0-1, 1-4,5-14, 15-29, 30-44, 45+). For family planning the conventional five-year age groups were used.

1. Population by sex, broad age groups and last illness episode.
2. Population by sex, broad age-groups and type of treatment sought for last illness.
3. Population by sex, broad age groups and amount paid for last illness.
4. Population by sex, broad age groups and tuberculosis status.
5. Population by sex, broad age groups and vaccination status.
6. Married couples by sex, five-year age groups and knowledge of family planning.

7. Married couples by sex, five-year age groups and use of family planning.
8. Married couples by source of family planning.
9. Married females by place of last birth.
10. Married females by attendance at last birth.
11. Married females by years of breastfeeding and sex of child.

4.7 CONCLUSION

The study was carried out in Daudzai thana or police ward in Peshawar tehsil, which is an administrative unit of Peshawar district, and Michni tribal area attached to Peshawar district. The 1971 Census list was used for the selection of villages in Daudzai; no similar list was available for Michni.

After considering several methods, which included the simple random sample of clusters and a systematic sample of clusters, it was decided to carry out a census or complete enumeration of the selected villages. The villages were not selected at random, but their choice was based on specific criteria. These were that the villages should represent in microcosm the social, economic, religious and cultural structure of the community; they should not be subject to excessive migration and immigration; they should not be too remote; and finally that they should be small so that a village list could be prepared and the households identified. A preliminary study of the area and discussions with research teams and village headmen led to the selection of twenty-one villages in Daudzai and Michni village.

The size of the study was determined after consideration had been given to the conventional factors that determine size, i.e. precision and the funds available. It was obvious from the outset that a preparatory study of this type which had to be carried out among a predominantly illiterate rural population would be subject to innumerable errors both on the part of the enumerators and the respondents. Furthermore it had no similar study to use as a criterion to judge precision, and in the analysis only the minimum breakdowns of the results were required. Therefore the determination of the size did not have to be calculated with the same mathematical precision as is usual in large studies. The study was further limited by the time and budget available. After discussions with Professor Brass it was decided that the minimum size in order to obtain reasonable results should be 2,000 households.

The census of the 22 villages was carried out by enumerators through formal interviews based on a structured questionnaire which had previously been prepared at LSHTM. It consisted of five sections. Section I was on economic and social characteristics of the household and included questions on tribe, structure of household and occupancy status, and economic status. Section II was on basic demographic characteristics, and obtained information on the total population, which was originally defined in terms of both de facto and de jure, i.e. comprehensive enumeration, household composition, relationship to head, sex and age, and birthplace and marital status. Section III contained questions on fertility and mortality. For the former the data consisted of both current fertility, i.e. date of last birth, and lifetime fertility, i.e. the number of children ever born to women, whereas the data on mortality were retrospective, i.e. deaths which involved no reference period. Information was obtained on infant mortality and adult mortality. The adult mortality was on survival of parents, survival of first spouse, and survival of siblings by sex. Section IV collected educational and occupation data. Section V was on health, family planning and pregnancy. The health questions were on last illness, place and cost of treatment, and tuberculosis and vaccination status. The family planning questions were on knowledge, practice and source of family planning. The pregnancy questions were on place of last birth, attendance at birth and breastfeeding practices.

Before the start of fieldwork the headquarters of the project were set up in Peshawar. The final staff consisted of the author, the consultant, a full-time interviewer, several part-time interviewers, a dai or trained midwife and a driver. Both PARD and the Ministry of Health had been approached in order to arrange for the recruitment of staff. With regard to male interviewers there was no shortage of applicants. However, this was not the case with females. It was not possible to employ the services of educated girls to work in the rural areas. The final selection of male interviewers had been based on the following requirements: general intelligence, patience in interviewing, willingness to work long hours in remote areas and an ability to communicate with the respondents. The requirements led to the selection of one male full-time interviewer, and several part-time interviewers from PARD. Full-time interviewing was also done by the author, the dai and the consultant.

The training of the interviewers was arranged in two parts, theoretical training and practical training. The former consisted of an introductory talk on the aims of the project. The talk was followed by an informal discussion which included an examination of the variables of the questionnaire, the definition of terms and concepts, and the methods of recording responses. It was emphasized that the interviewers should aim at the correct and accurate record of responses, the completion of all the variables in the questionnaire and that they should avoid influencing respondents. Emphasis was on the latter part of the training which took place in the field. It was valuable in that it brought to light several problems that were further discussed and clarified. On the whole the interviewers were highly qualified and experienced in the field, and were therefore able to maintain relatively high standards.

The aim of the pilot study which was conducted before the census was to test the clarity, accuracy and suitability of the questionnaire in the context of the study area, to provide a practical training course for the enumerators, to assess their rate and ability of work, and to underline any shortcomings in the team's approach to fieldwork. The pilot study was conducted in the village of Bela Mohmandan; a total of 50 households were interviewed. After completion of the pilot study, certain minor modifications were introduced into the questionnaire. These involved the inclusion of questions on the subtribe of the household, livestock ownership, source and purpose of credit; and the exclusion of the question on serious illness episode in last year, which was found to overlap with the question on the nature of last illness, and questions on nutrition which enquired into the eating habits of the population. The latter were not only producing uniform answers but the respondents resented being questioned on food shortages.

The major modification involved the redefinition of the concept of total population. Although the enumerators had been asked to carry out a comprehensive enumeration, this did not correspond to the way of thinking of the population. In listing the population the heads of households only included the <u>de jure</u> population, i.e. head of household, dependants, relatives and servants. This concept was reinforced by the manner in which the interviews were conducted.

On the whole the pilot study proceeded smoothly, but it was not a good test to judge the rate of work of the interviewers. Their rate of work was extremely slow, i.e. three to four questionnaires a day, because they had not fully adapted to the work procedures. This was drastically changed as the study proceeded. With regard to the method of fieldwork, it was decided to prepare a formal list of households in each village before the conduct of interviews in order to avoid repetition.

The census enumeration began at the end of February and lasted about a year. The team was conveyed to the study village each day by jeep. Interviewing began early in the morning and lasted until the evening. It was decided not to stay overnight in the villages while working in the remoter areas because, firstly, there was no electricity and the villagers retired to bed early, and, secondly, because the study could not maintain its objectivity if it became associated with the hosts and, as a result, encountered non-cooperation from rival factions.

Prior to the start of enumeration in each village the village headman or some other local authority was contacted to inform the people. A formal list of households was drawn up by the consultant in collaboration with the village headman and the figures were checked against the 1971 Census. In all cases they tallied, with one exception where a village had been partially destroyed by flood. From the list a certain number of households were allocated to each interviewer. The author and the dai conducted a house to house census, whereas the male enumerators, because of local customs, were restricted to the hujra or guesthouse, the mosque, the fields and the ghor ghani or cane crusher. Although the female team had access to the houses, it was difficult to interview the women, because of the other women and children who gathered to create a distraction, and because of the ignorance of the female population. The men were getting better cooperation, but they were not able to conduct the interviews in complete privacy because of the limited space available for interviewing. This created some problems with regard to the hypothetical and attitudinal questions. The questions were asked in Pushtu and were recorded in English.

In the case of non-response due to members who were absent, the wives or other relatives were interviewed, and the information was checked on the return of the absent member, whereas non-response due to non-cooperation was only encountered in one or two isolated cases in Michni

This is not to say that people were not hesitant in providing information on certain questions such as income and landholdings.

The 100% response rate and cooperation extended to the project by the population was due to the consultant's association with the study. He had previously served the people through the Daudzai project and was well known to them. Furthermore, according to the Pathan code of honour, guests are treated with respect and hospitality. It could be argued that the consultant's close association with the people could have created a bias, encouraging them to give those responses that would please the enumerators. This was not the case as it was emphasized that it would be appreciated if they gave an accurate response to each question.

Several precautions were taken to minimize errors in the data collection process. This included the simple design and content of the questionnaire and the conduct of a pilot study to test for suitability; the theoretical and practical training given to the enumerators; measures in the data collection procedures which included prior notification to the population, observance of local conventions, courtesy and patience shown at all times to the respondents; and finally the supervision of the work by the author and the consultant not only in the field but also in checking questionnaires for accurateness and completeness.

The main problems of fieldwork were related to women. With regard to the questionnaire, the heads of households were not willing to give the names of their womenfolk to the male enumerators, and therefore they had to be content with listing the female members as woman 1, woman 2, girl 1, girl 2. In spite of this setback, every effort was made to ensure that females were not being underenumerated, especially young unmarried girls. In the data collection the men were not permitted to conduct a house to house census because of the pardah system. The author and the dai, on the other hand, were able to interview women, but found it very difficult because of their ignorance not only in terms of education but also in terms of their contact with the outside world, which made it hard for them to understand the questions. Therefore it was found necessary to abandon interviewing women. Finally it was not possible to recruit the services of educated female interviewers to work in the rural areas. This, in the long run, turned to the advantage of the study, because not only would it have been difficult to transport them to the villages with the men, in a society where there is a strict segregation of the sexes, but also a group of young girls would have created negative talk in the village which would have been detrimental to the study. Another major problem of fieldwork was transport. Although the Ministry of Health and the Directorate for Rural Development extended their full cooperation, in times of emergencies, such as floods, they were obliged to recall their jeep, which resulted in the study being brought to a complete standstill.

All the completed questionnaires were checked, edited and numbered serially. The data were tabulated by hand. All the questionnaires and the hand-tabulated data were air-freighted to London for analysis at the LSHTM. After a preliminary examination of the data by Professor Brass it was decided to process it on the computer. The data were then coded, punched and fed into the computer where they were edited for incorrect codes and inconsistencies and duplication of serial numbers. The necessary corrections were introduced . and the data were transferred to magnetic tape where they were put on a hierarchical data system, after which a package programme was applied to obtain the tables necessary for analysis. The difference between the hand-tabulated results and the computer results was not significant.

FOOTNOTES

1. The United Nations recommendation for the 1970 Census definition of the household is: 'The concept of household is based on the arrangements made by persons, individually or in groups, for providing themselves with food or other essentials for living. A household may either be (a) a one-person household, that is, a person who makes provision for his own food or other essentials for living without combining with any other person to form part of a multi-person household or (b) a multi-person household is a group of two or more persons who make common provisions for food or other essentials of living. The persons in the group may pool their incomes and have a common budget to a greater or lesser extent; they may be related or unrelated persons or a combination of both' (U.N., 1974, p. 36).
2. There are no clear age grades as in Africa, but the rites de passage are remembered public ceremonials; these were more sharply defined for males than for females especially in early childhood (Chapt. 3, Sec. 3.6.1.D).
3. Errors inherent in the preceding 12 months method include: dating errors, births in the reference period excluded because they were thought to have occurred previously, or conversely births included erroneously which occurred before the reference period; recall lapse or omission of children, especially those who have died shortly after birth; and errors due to a low incidence of events, since women who gave birth 12 months prior to the study constitute only 4-5% of the total population, and therefore births are omitted because enumerators

anticipate negative answers even in those cases where the response should have been in the affirmative (U.N., 1974, p. 49).

4. Dorland's Medical Dictionary (25th edn., Philadelphia, London and Toronto: W.B. Saunders, 1965).

CHAPTER 5

METHODOLOGY AND RESULTS: SEX-DIFFERENTIAL MORTALITY

5.1 INTRODUCTION

This chapter first examines the sex-differentials in the quality of data in the context of the study area and the methods of data collection. It then briefly outlines the theoretical models underlying the procedures for estimating early childhood and adult mortality and the practical application of these methods. Finally, the results of the mortality calculations are compared with evidence from other surveys, in particular the PGE and the BRSFM, and the validity of the hypothesis, that there are sex-differentials in mortality to the detriment of females, is evaluated in the light of the evidence gathered in the chapter and other relevant facts.

5.2 QUALITY OF DATA

The quality of the data was assessed for completeness of enumeration of both sexes and for the accuracy of reports of retrospective mortality related to both sexes.

5.2.1 Coverage

Direct and indirect evidence can be examined in order to appraise the quality of data with regard to sex-selective enumeration.

A. Direct evidence

In the present study it was not possible, because of the limited funds available, to carry out a post-enumeration check to assess the completeness of coverage and the quality of the census information. Therefore no precise figures of the degree of underenumeration can be estimated. However, it is possible to rely on broad impressions based on a subjective assessment of the completeness of coverage.

The informal checks that were carried out did not bring to light any case of omission of persons. Nevertheless, it is pertinent to point out, in this connection, the difficulty of interviewing women because of the pardah system and other related factors(Chapt. 4, Sec. 4.5.2). In most instances heads of household provided the information for their families and they were reluctant to disclose the names of their female relatives to the male enumerators; as a result the relationship to the head of the household rather then the name of the female was entered (Chapt. 4, Sec. 4.5.1).The fact that the women were not interviewed in their houses may have resulted in the omission of a few females from the census count, but there is no proof that there was any significant underenumeration of females.

B. Indirect evidence

It is well recognized that if the census coverage of one sex is more deficient than that of the other, the data on various characteristics of the population would manifest these inconsistencies. In populations that have not been effected by migration, the characteristics that help disclose the deficiencies of demographic data are: the shape of the age distribution for each sex; the sex ratio of the total population and the population in each age group; and the marital status distribution for each sex.

Age distribution: In a stationary population, if the sex ratio at birth is 105 males to 100 females and if there is no mortality differential between the two sexes at different ages, the difference between the two curves depicted is a strictly monotonically decreasing function of x in the range 0 to W, where W is a very advanced age. The male and female distributions were examined in the light of this knowledge.

The female age distribution showed a hump in the age group 5-9 followed by a sharp dip in the ages 20-24 and a hump in the age group 25-29. This pattern of humps succeeded by dips was continued into the older ages. The corresponding male distribution began with a dip in the age group 0-4 and rose to a hump in the ages 5-9. The pattern in the subsequent ages was similar to females.

The striking feature about these distributions was a deficiency of male children in the age group 0-4, a shortage of females at almost all ages, and particularly in the age group 10-14 and in the older ages, i.e. above 85 (Fig. 6).

It has been agreed that these fluctuations, which have been observed in almost all developing countries, are largely attributable to age misreporting especially in the older ages. However, it is impossible to distinguish between the effects of age misreporting and genuine underenumeration.

Age misreporting: It is quite likely that the major cause of the fluctuations observed in the age distributions was the result of age misreporting. Few people are aware of their correct ages, and in most instances, enumerators had to be satisfied with approximate ages, obtained from the head of the household for all members forming part of his family. In his absence, a relative or some other reliable member provided the information. In cases of doubt, the *rites de passage*, which play an important role in the life of the individual, or the age of the repondent relative to other members of the household or community, were used to arrive at an estimate (Chapt. 4, Sec. 4.3.2.0).

These estimates may sometimes have led to over-reporting or under-reporting of ages and introduced a bias both in the case of males and females.

It has been suggested that for cultural reasons there is usually a systematic omission of unmarried daughters and young wives. In this connection, sex ratios and the marital status, distributions will be examined. However, while it is not possible to say conclusively that there was no underenumeration of young females, it seems that the more probable explanation to the erratic fluctuations observed in the age distributions of males and females is attributable to systematic biases in the misreporting of ages.

Sex ratios: In the absence of migration the sex ratios of a population are a function of the sex ratios of births and deaths. The excess of males at birth, observed in countries with a reliable vital registration system, is soon eliminated by the relatively higher mortality experienced by males, particularly during the first year of life, with the result that the sex ratios, with each advancing age group, tend to move in the direction of a balance, until at a certain point females tend to outnumber males.

The sex ratio of the total population was 1084 males to a 1000 females. Males outnumbered females at all ages except in the age groups 0-4, 30-34 and 40-45. The masculinity was highest for the ages 10-14 where there were 1287 males to a 1000 females (Table 5.1). Although the sex ratio for the total population shows a masculinity in the enumerated population, it is lower than the sex ratios of 1098 and 1111 recorded in the last Pakistan censuses,

Table 5.1.

Sex Ratios (Males per 1000 Females) by Age and Marital Status Groups

Age	Sex ratio of the total study population (1)	Sex ratios of the currently married (2)	Sex ratios of the widowed, divorced and separated (3)
0-4	966	–	–
5-9	1115	–	–
10-14	1287	143	–
15-19	1137	165	3000
20-24	1058	449	250
25-29	1129	876	–
30-34	968	869	286
35-39	898	917	–
40-44	1078	1142	100
45-49	961	1019	136
50-54	1186	1470	375
55-59	983	1168	146
60-64	1098	1705	174
65+	1232	2734	210
TOTAL	1084	959	314

The sex ratio for persons < 30 years was 1101 and for persons > 30 1043 and is in keeping with the sex ratio of 1087 for the North West Frontier Province of Pakistan (Pakistan, 1951, Table IV; Pakistan 1961, Table I; PGE, 1968, p. 158). It is probable that the erratic variations in the sex ratios between age groups, i.e. the shortage of men in some ages, is largely due to age misreporting, whereas the high masculinity observed in the total enumerated population and at most ages could be attributed to a genuine deficit of females rather than to any significant degree of underenumeration.

Marital status data: The marital status data were classified into three categories: never married; married; widowed, divorced and separated. The widowed, divorced and separated were grouped together on the ground that the number of divorced and separated was very small. Consistency in the number of males and females will be examined in the three categories.

In the absence of migration, polygamy and the underenumeration of either sex, the ratio of the currently married should normally be close to unity. The sex ratio of currently married males was 958.6 to 1000 females (Table 5.1). This figure is quite close to unity and the small variation could have arisen due to the limited prevalence of polygamy or to the errors of classification and reporting.

The sex ratio of the widowed, divorced and separated is the result of the differential rates of marital dissolution, mortality and remarriage. Divorce and separation are considered shameful and, as a result, the number of persons in these groups is very small (Chapt. 3, Sec. 3.6.2.E).

With regard to the influence of mortality on widowhood, it is generally accepted that, in the Indian Subcontinent, unlike the experience of Western populations, the chances of a man becoming a widower are higher than that of a woman becoming a widow. The rates of remarriage after widowhood are another important factor in the sex ratio of the widowed. The sex ratio of the currently widowed/divorced and separated was 314 men to 1000 women. This imbalance could be explained by the higher male remarriage after widowhood. Among the ever married 10.9% males had married more than once as compared to 1.1% females (Table 5.1).

It is not possible to study the sex ratios of the never married in order to assess the degree of underenumeration of young females, because the differences in the mean age at marriage of the two sexes often results in an imbalance of males among the never married. However, the sex ratios of those under 30, a group composed mainly of the never married and the currently married, can be compared to those over 30. These were 1101 and 1043 males to a 1000 females respectively(Table 5.1). The figure for those under 30 does not differ greatly from the sex ratio of the total population observed in the Government censuses. Therefore it can be stated that, as in the case of the age distributions and the sex ratios, there may have been some underenumeration of females at the younger ages, but that a more plausible explanation is a genuine deficit of females and age misreporting.

5.2.2 Mortality data

Past experience in the Indian Subcontinent has shown that cultural factors prevalent in the society can introduce sex-selective biases to the detriment of females in the registration of vital events. Similar biases can also be introduced in the reporting of retrospective data on mortality.

A. Childhood mortality data

In patriarchal societies males are valued more than females. This preference is unmistakable from the moment of birth. Although there are no formal religious ceremonies associated with birth, the birth of a son is a memorable occasion, for it is an event welcomed and celebrated by everyone in the village. On the other hand, the birth of a daughter goes unnoticed (Chapt. 3, Sec. 3.6.1.D). In those cases where the female child dies immediately after birth, and the event is forgotten by the head of the household, it is also less likely to be remembered by other villagers, in so far as the knowledge of death is associated with the knowledge of birth. Therefore, it is possible that female deaths may have been under-reported more often than male deaths.

B. Adult mortality data

It has already been pointed out that, in most instances, the census information was collected from the head of households. This could have resulted in an under-reporting of female adult mortality because of cultural factors, such as marriage customs, segregation of the sexes and widower remarriage.

According to the local custom, if a female relative of the same lineage is not available in the village, a man usually procures a wife from another village from the same clan (Chapt. 3, Sec. 3.6.2.B). The two families become related and all relatives, i.e. agnates, cognates and affines, are expected to participate in the <u>rites de passage</u>, in particular marriage and death ceremonies (Chapt. 3, Sec. 3.6). However, affines may not always attend these celebrations, especially if the wife's village is at some distance. Furthermore, the purdah system results in the segregation of the sexes even among married relatives. Therefore the head of the household is more likely to be aware of the wife's paternal orphanhood and male siblings status than of her maternal orphanhood and female siblings status, and he would be more likely to give a positive response than a negative one, particularly in those cases where the father-in-law has remarried.

Remarriages among widowers, which appears to be more prevalent among men than among women (Table 5.1), could also have created an under-reporting of female mortality, in those cases when the first wife was reported as alive rather than dead, an error which arises if the event has occurred a long time ago.

There is no direct evidence of sex-selective under-reporting of female retrospective mortality, but cultural factors do suggest that such biases could have been introduced.

5.3 MORTALITY ESTIMATION

Mortality was estimated by the indirect methods known as the Brass methods. These methods are based on the use of questions on retrospective mortality, i.e. past events concerning the population without any dating or reference period. The estimates derived from them are averages of mortality experience over long or short periods of time.

The indirect method has the advantage that it is not based on a reference period and is therefore not subject to dating errors; the data are based on a larger number of persons; and the analytical techniques are robust, i.e. the estimates are insensitive to age misreporting or to deviations in the patterns of fertility and mortality from those of the models used for the estimation procedure.

The estimation of mortality by the indirect methods is dependent on the calculation of certain population parameters. These include the mean parities by age group, i.e. the number of children born per woman, and $\bar{m}$, the mean age of the fertility schedule for the calculation of childhood mortality. $\bar{M}$, $\bar{M}^*$ the mean age of mothers and fathers at the birth of their children, the mean age at first marriage for females, and the population mean age at marriage for males, is required in the orphanhood and widowhood methods respectively for converting the retrospective mortality information into life table survivorship probabilities. The childhood mortality estimate in conjunction with the adult mortality is used for the final construction of the life table. It is also necessary to establish from the crude birth rate and the crude death rate that the growth rate of the population is of the right order (Brass, 1975, pp. 50-105; Hill and Trussell, 1977, 313-374). The calculation of the population parameters, listed above, is described in relation to each method, and the tables are given in the methodological annex to the chapter.

5.3.1 Childhood mortality

The theoretical model underlying the procedure for the estimation of childhood mortality is described in Annex 5.7.1 of this chapter. The practical application of the method is given below.

To estimate childhood mortality from the reports of mothers of the number of children dead from the total number of children ever born, two population parameters are required for the selection of the multiplying factors. These include $\bar{m}$, the mean age of the fertility distribution, and P_2/P_3, the quotient of P_2, the mean parity of women in the second age group (20-24), and P_3, the mean parity per woman in the third age group.

Selection of K: The mean age of the fertility distribution was 31.0 years based on the total births in the last year, 30.2 years for male births alone and 31.7 years for female births (Table 5.2. A; 5.2.B; 5.2.C). The mean of the ASFD (Age-Specific Fertility Distribution) is used for the selection of multiplying factors for the older ages, i.e. above 30. However, these values were considered too high and P_2/P_3 were used for the selection of multiplying factors at all ages.

The ratio P_2/P_3, which is used as an index to select the multiplying factors for the younger age groups, was 0.492 for children of both sexes combined, 0.4629 for male children alone and 0.5298 for female children (Table 5.3). It was decided to use the ratio P_2/P_3 based on the births of both sexes combined, in order to select the K factors, to convert the proportion of dead children into life table probabilities of dying for each sex separately. The choice was based on the following consider-ations. Firstly, the K factors are based on the fertility distribution of all children $\left\{f_{(y)}=c(y-s)(s+33-y)^2\right\}$. The sex of a child at birth is a purely random event with predetermined probabilities, i.e. when a child is born it can either be male or female, but the sex ratio is usually 106 male births to every 100 female births. The probability of the birth of a male child is 106/206, and 100/206 for a female child. If the sex ratio at birth is 106 males to 100 females, for all births at all ages, between 15 to 50, then the fertility distribution for male and female births should be the same as that for the births of children of both sexes. Secondly, the ratio P_2/P_3 based on children of both sexes is from a larger sample. It is therefore statistically sound to use the value based on the total sample, i.e. males and females, rather than on part of the sample.

<u>$q_{(2)}$</u>: The K factors selected on the basis of P_2/P_3 were multiplied with the proportion of children dead, which is the number of children dead divided by the total number of children ever born by age of mother, for both sexes and for each sex separately. The $q_{(2)}$ values for both sexes combined were 0.1705, according to the Brass method, and 0.1741, according to the Sullivan equation. The $q_{(2)}$ values for each sex separately, based on the selection of K on the basis of the ratio P_2/P_3 for children of both sexes, was 0.1843 and 0.1550 for males and females respectively (Table 5.4.A; 5.4.B; 5.4.C).

To determine whether $q_{(2)}$ obtained for males and females separately was consistent with $q_{(2)}$ obtained for both sexes combined a check was applied by the following method:

Males	$q_{(2)} = 0.1843$, $l_2 = 0.8157$
Females	$q_{(2)} = 0.1550$, $l_2 = 0.8450$
Males + Females	$q_{(2)} = 0.1705$, $l_2 = 0.8295$

Table 5.4.A

Calculation of $q(2)$ based on data of children of both sexes

Age of Mother (1)	Proportion Dead (%) (2)	$D(i)$ (3)		Multiplying Factors K for $P_2/P_3 = .492$ (4)	$q(i)$ (3)×(4) (5)		Sullivan Equation*
15-19	21.6216	or .2162	(D_1)	0.975	0.2108	$q(1)$	—
20-24	16.9014	or .1690	(D_2)	1.009	0.1705	$q(2)$	0.1741
25-29	16.6941	or .1669	(D_3)	0.993	0.1657	$q(3)$	0.1619
30-34	18.0759	or .1808	(D_4)	1.001	0.1810	$q(5)$	0.1754
35-39	19.2077	or .1921	(D_5)	1.011	0.1942	$q(10)$	

$P_2/P_3 = .492$ based on data of total children.

*$\frac{q(2)}{D_2} = 1.30 - 0.54\left(\frac{P_2}{P_3}\right)$ $\therefore$ $q(2) = 0.1741$

$\frac{q(3)}{D_3} = 1.17 - 0.40\left(\frac{P_2}{P_3}\right)$ $\therefore$ $q(3) = 0.1619$

$\frac{q(5)}{D_4} = 1.13 - 0.33\left(\frac{P_2}{P_3}\right)$ $\therefore$ $q(5) = 0.1754$

TABLE 5.4.B

Calculation of $q(2)$ based on Female children born by Age of mother

Age group of Mothers	Proportion Dead	K for $P_2 \div P_3 = .5211$	$q(i)$
(1)	(2)	(3)	(4)
15-19	.2297	.934	.2145 $q(1)$
20-24	.1536	.986	.1515 $q(2)$
25-29	.1714	.980	.1680 $q(3)$

$q(2)$, when K factor corresponding to $\frac{P_2}{P_3}$ (.4629) of both sexes combined

$= (.1536)(1.009) = 0.\underline{\underline{1550}}$

$\therefore\ l_2 = 1 - .1550 = .845$

TABLE 5.4.C

Calculation of $q(2)$ based on Male children born by Age of mother

Age group of Mothers	Proportion Dead	k for $P_2 \div P_3 = .4529$	$q(i)$
(1)	(2)	(3)	(4)
15-19	.2027	1.013	.2053 $q(1)$
20-24	.1827	1.028	.1878 $q(2)$
25-29	.1635	1.004	.1642 $q(3)$
30-34			

$q(2)$, when K factor corresponding to $\frac{P_2}{P_3}$ (.4629) of both sexes combined

$= (.1827)(1.009) = 0.\underline{\underline{1843}}$

$\therefore\ l_2 = 1 - .1843 = .815$

TABLE 5.4.D

CALCULATION OF $q_{(i)}$ BY SEX FOR OLDER AGES

Age of Women	MALES Prop. DEAD	FEMALES Prop. DEAD	K FOR $P_2 \div P_3 = .492$		$q_{(i)}$ MALES	$q_{(i)}$ FEMALES	l_x MALES	l_x FEMALES
30-34	·1979	·1613	1·001	$q_{(5)}$	·1981	·1615	·8019	·8385
35-39	·1861	·1985	1·011	$q_{(10)}$	·1881	·2007	·8119	·7993
40-44	·1939	·1753	0·988	$q_{(15)}$	·1916	·1732	·8084	·8268
45-49	·2243	·2322	0·986	$q_{(20)}$	·2212	·2289	·7788	·7711
50-54	·2238	·1619	1·001	$q_{(25)}$	·2240	·1621	·7760	·8379
55-59	·2857	·2413	1·002	$q_{(30)}$	·2863	·2418	·7137	·7582
60-64	·3299	·2928	0·999	$q_{(35)}$	·3296	·2925	·6704	·7075

Sex Ratio

Based on Total Children born to married women in different age groups and combination of age groups.

Age Group of Women	Sex Ratio (2) ①	Age Group of Women	Sex Ratio (2) ②
15-19	100.00	15-19	100.00
20-24	112.73	15-24	109.97
25-29	129.00	15-29	121.56
30-34	113.74	15-34	117.54
35-39	107.99	15-39	114.59
40-44	114.53	15-44	114.58
45-49	115.83	15-49	114.80
50-54	120.87	15-54	115.56
55-59	118.23	15-59	115.76
60-64	133.47	15-64	117.33
65-69	144.32	15-69	118.18
70-74	129.25	15-74	118.57
75-79	143.90	15-79	118.74
80-84	120.71	15-84	118.78
85+	163.33	15+	119.00

① $\text{Sex Ratio} = \dfrac{\text{Total Male children ever born}}{\text{Total Female children ever born}} \times 100$

② Sex Ratios correspond to cumulative age groups.

Sex Ratio of births in last year $= \dfrac{247}{240} \times 100 = 102.92$

Sex Ratio for age group of women 20 - 39 =

$$\frac{301 + 685 + 1051 + 865}{267 + 531 + 924 + 801} = \frac{2902}{2523} = 115.02$$

If l_o=10,000 and the sex ratio at birth=113, which is the ratio of total births to women in the age group 20-24 (Table 5.5),

$$l_o^{m}=10,000 \qquad l_o^{f}=10,000 \qquad l_o^{m+f}=(1.13 \times 10,000)+(10,000)$$

$$l_2^{m}=8,157 \qquad l_2^{f}=8,450 \qquad l_2^{m+f}=(1.13 \times 8,157)+(8,450)$$

$$l_o^{m+f}=21,300 \qquad \text{For } l_o=10,000$$

$$l_2=17,667 \qquad l_2=8,294 \text{ and } q_{(2)}=.1706$$

The value obtained for $q_{(2)}$ of 0.1706 is very close to the value of $q_{(2)}$ obtained for both sexes combined. Therefore the $q_{(2)}$ values that were used for the construction of the life table were based on D_2 values of each sex separately multiplied by the K factor selected for P_2/P_3 for both sexes combined.

5.3.2 Adult mortality from orphanhood

The orphanhood technique was developed to estimate female and male adult mortality from questions on the survival of mothers and fathers. The theoretical model is explained in Annex 5.7.2. The practical application is given below.

The first method is based on the selection of the relevant multiplying factors, to convert the proportion of persons, with mother alive or father alive, in each age group, into life table probabilities of surviving, from base age B to age B+N, where N is the midpoint of the age group. The factors are selected on the basis of $\bar{M}$, the mean age of mothers and fathers at the birth of their children, and N, the midpoint of each age group of children.

Maternal orphanhood I: $\bar{M}$, the mean age of mothers at the birth of their children, was calculated from the age distribution of women, for all births that had occurred in the last year, i.e. 12 months preceding the study. This gave a figure of 29.7, from which 0.5 was subtracted, because on an average, the births had occurred half a year before the date when the ages of the mothers were recorded. The mean age of mothers thus calculated was 29.2 years (Table 5.6)

K, the multiplying factors for a value of $\bar{M}$ of 29.2 years were calculated, from B of 27.5 years and 30.0 years, by linear interpolation (Table 5.7). It is important to select those factors that are closest to unity. The factors for base age B of 30 were closer to unity for all ages, except the older ages, 45-49, 50-54, than those selected from base age 27.5. It is possible to combine those factors that are closest to unity from two base ages. However, for practical purposes, a single complete table corresponding to a single base of B=30.0 years was selected.

The proportions of respondents with mothers alive were then converted into life table probabilities of surviving (Table 5.7).

Table 5.7

Survivorship of Mothers

Age group of Children	Midpoint of Age Interval N	Proportions of Surviving Mothers	Corresponding Factors from 27.5	to M=29.2 B=30.0	$\frac{l_{27.5+N}}{l_{27.5}}$	$\frac{l_{30+N}}{l_{30}}$
(1)	(2)	(3)	(4)	(5)	(6) = (3) x (4)	(7) = (3) x (5)
5-9	7.5	.9826	1.006	1.002 (b)	.9885 = $(l_{35}/l_{27.5})$	.9846 = $(l_{37.5}/l_{30})$
10-14	12.5	.9635	1.014	1.006 (b)	.9770 = $(l_{40}/l_{27.5})$	.9693 = $(l_{42.5}/l_{30})$
15-19	17.5	.9344	1.025	1.010 (b)	.9578 = $(l_{45}/27.5)$	.9437 = $(l_{47.5}/l_{30})$
20-24	22.5	.9123	1.040	1.012 (b)	.9448 = $(l_{50}/27.5)$	.9232 = $(l_{52.5}/l_{30})$
25-29	27.5	.8699	1.059	1.014 (b)	.9212 = $(l_{55}/27.5)$	.8821 = $(l_{57.5}/l_{30})$
30-34	32.5	.7755	1.086	1.010 (b)	.8422 = $(l_{60}/27.5)$	.7833 = $(l_{62.5}/l_{30})$
35-39	37.5	.6446	1.108	0.988 (b)	.7142 = $(l_{65}/27.5)$	.6367 = $(l_{67.5}/l_{30})$
40-44	42.5	.5432	1.126	0.941 (b)	.6116 = $(l_{70}/27.5)$	.5112 = $(l_{72.5}/l_{30})$
45-49	47.5	.4124	1.085 (b)	0.807	.4475 = $(l_{75}/27.5)$	.3328 = $(l_{77.5}/l_{30})$
50-54	52.5	.3023	0.987 (b)	0.640	.2984 = $(l_{80}/27.5)$	.1937 = $(l_{82.5}/l_{30})$

(b) = Factors close to 1.000

Maternal orphanhood II: Weights for the second method are also selected on the basis of two parameters: $\bar{M}$, the mean age of mothers at the birth of their children; and N, the central age of two adjacent age groups.

The value of $\bar{M}$ of 29.2, already obtained by the first method (Table 5.6), was used to calculate the weighting factors by linear interpolation(Table 5.8).

The proportions of respondents with mothers alive were then converted into life table probabilities of surviving, from a fixed base age B, according to the estimating equation for the second method (Table 5.8).

Paternal orphanhood I :The calculation of paternal orphanhood follows the same procedure used to develop estimates of female mortality. It is dependent on $\bar{M}^*$, the mean age of fathers at the birth of their children; and N+2.5, the midpoint of the age interval; and the correction to take into account the gestation period.

There are several ways of deriving an estimate of $\bar{M}^*$, the mean age of fathers at the birth of their children. The most obvious is the calculation of $\bar{M}^*$ from the age distribution of men whose wives had given birth in the last year, i.e. 12 months preceding the census. This information was not available on the computer, and therefore the data had to be tabulated by hand. The average age of fathers, from a total of 487 births, was 35.95 years. As in the case of females, it is assumed that the births, on an average, occurred half a year before the study. Therefore the average age of fathers was calculated at 35.45 years (Table 5.9.A).

TABLE 5.8.

FEMALE ADULT MORTALITY BY ORPHANHOOD METHOD (W_N) FROM RESPONSES OF ALL CHILDREN MALES + FEMALES

Age group of children	Mothers Alive	Mothers Dead	TOTAL	Proportion with Surviving Mothers	N	N+25	W_N (M=27.2)	$\{W_N \cdot {}_5P_{N-5} + (1-W_N) \cdot {}_5P_N\} = \frac{l_{25+N}}{l_{25}}$
(1)	(2)	(3)	(4)	(5)=(2)÷(4)	(6)	(7)	(8)	(9)
5-9	2425	43	2468	0.9826				
					10	35	0.725	$0.725 \times .9826 + (.275 \times .9635) = .9773 = (l_{35}/l_{25})$
10-14	1714	65	1779	0.9635				
					15	40	0.875	$0.875 \times .9635 + .125 \times .9344 = .9599 = (l_{40}/l_{25})$
15-19	1126	79	1205	0.9344				
					20	45	1.020	$1.020 \times .9344 - .020 \times .9123 = .9348 = (l_{45}/l_{25})$
20-24	843	81	924	0.9123				
					25	50	1.138	$1.138 \times .9123 - .138 \times .8699 = .9182 = (l_{50}/l_{25})$
25-29	876	131	1007	0.8699				
					30	55	1.227	$1.227 \times .8699 - .227 \times .7755 = .8913 = (l_{55}/l_{25})$
30-34	670	194	864	0.7755				
					35	60	1.298	$1.298 \times .7755 - .298 \times .6446 = .8145 = (l_{60}/l_{25})$
35-39	350	193	543	0.6446				
					40	65	1.308	$1.308 \times .6446 - .308 \times .5432 = .6758 = (l_{65}/l_{25})$
40-44	333	280	613	0.5432				
					45	70	1.289	$1.289 \times .5432 - .289 \times .4124 = .5810 = (l_{70}/l_{25})$
45-49	186	265	451	0.4124				
					50	75	1.140	$1.140 \times .4124 - .140 \times .3023 = .4275 = (l_{75}/l_{25})$
50-54	146	337	483	0.3023				
					55	80	0.901	$0.901 \times .3023 + .099 \times .1441 = .2866 = (l_{80}/l_{25})$
55-59	34	202	236	0.1441				
					60	85	0.623	$0.623 \times .1441 + .377 \times .1172 = .1340 = (l_{85}/l_{25})$
60-64	45	339	384	0.1172				

This estimate of the mean age of fathers at the birth of their children was not used because of the discrepancies in the hand-tabulated data (Cf. Table 5.9.B and Table 5.6).

The second method involved an indirect estimation procedure. The mean age of fathers is assumed to be equal to the mean age of mother plus a constant. The constant is equal to the age differential between males and females at marriage. The equation is expressed as follows:

$$\bar{M}^{*}=\bar{M}+d$$

The difference in the mean age at marriage for males and females was calculated. It was 6.92 years for the currently married(Table 5.10.A); 4.56 years for those ever married (Table 5.10.B). The difference in the mean age at first marriage was 5.58 years for those married once only (Table 5.10.C); 5.88 years for those married once and currently married(Table 5.10. D); 6.23 years for those ever married (Table 5.10.E).

It was decided to use the distribution of the currently married persons, because the other estimates were unsatisfactory in that they either related to first marriage, omitting those that had remarried, or included those who were not currently married, i.e. the widowed, divorced or separated.

The difference, in the mean age of currently married persons, of 6.92 years was added to 29.2 years, the mean age of mothers at the birth of their children, to give an estimate of the mean age of fathers of 36.1 years. The mean age of 35.45 years (Table 5.9.A) corroborated the estimate obtained by the indirect method, i.e. a difference of 0.6 years. The estimate for $\bar{M}^{*}$ of 36.1 years was used to select the relevant factors.

The multiplying factors were calculated from the base ages 32.5, 35.0 and 37.5 years for a value of $\bar{M}^*$ by linear interpolation (Table 5.11). According to the rule that only those factors that are closest to unity should be selected, it would have been necessary to vary the value of B from one age range of respondents to another, i.e. for the earlier ages B values of 35.0 years were closer to unity, whereas for the later ages B values of 32.5 fitted better. However, this procedure of changing base ages was considered inconvenient and it was decided to use the factors for B values of 35.0 years, because it contained more values that were closer to unity.

The proportion of respondents with fathers alive were converted into life table probabilities of surviving according to the estimating equation of the first method (Table 5.11).

Paternal orphanhood II: In the second method weights were calculated for the value of $\bar{M}^*$ of 36.1 years, from the base age 37.5 years, by linear interpolation. The proportions not orphaned were then converted into life table probabilities of surviving according to the estimating equation of the second method (Table 5.12).

5.3.3 Adult mortality from widowhood

The widowhood method was developed to estimate adult male and female mortality from information on the survival of the first spouse. The theoretical model underlying this procedure is described in Annex 5.7.3. The practical application is given below.

The proportions not widowed are converted into life table probabilities of surviving, from a base age of, 22.5 or 27.5 to N+5 for males, depending on the female mean age at first marriage; and 17.5 or 22.5 to N-5 for females, depending on the male mean age at first marriage, by means of weights. The weights are selected on the basis of the mean age at first marriage, and N, the central age of two adjacent age groups.

Male mortality: To calculate male adult mortality from information of widowhood from female respondents, it was necessary to work out the male population weighted mean age at first marriage and the female mean age at marriage.

Population weighted mean age at first marriage: The proportion single in each age group, which is the ratio of the number single to the total number in that age group, was converted into rates by the following procedure. The first rate, for the age group 10-14, was obtained by the subtraction of the proportion single in that age group from 1.0000. For the other age groups, the rates were the differences of the two consecutive proportions single. These rates referred to new age groups, which were the midpoints of the preceding age group to the midpoint of the age group (Table 5.13).

The population was then adjusted to correspond to the new age groups by using age splitting coefficients. The middle age group coefficients were

TABLE 5.11

CALCULATION OF MALE ADULT MORTALITY BY ORPHANHOOD METHOD.

Age of Respondent	Midpoint (x)	Proportion of Surviving Fathers	Corresponding to $\bar{M}^* = 36.1$ Factors from B =			$l_{B+x+2.5} / l_B$					
			32.5	37.5	35.0	32.5		37.5		35.0	
	(1)	(2)	(3)	(4)	(5)	(6) = (2) × (3)		(7) = (2) × (4)		(8) = (2) × (5)	
5-9	7.5	.9773	1.0081	0.9867	0.9989 (b)	.9852	$(l_{42.5}/l_{32.5})$	.9643	$(l_{47.5}/l_{37.5})$	.9762	(l_{45}/l_{35})
10-14	12.5	.9505	1.0302	0.9872	1.0116 (b)	.9792	$(l_{47.5}/l_{32.5})$	.9383	$(l_{52.5}/l_{37.5})$	.9615	(l_{50}/l_{35})
15-19	17.5	.8913	1.0563	0.9811 (b)	1.0217	.9415	$(l_{52.5}/32.5)$	.8745	$(l_{57.5}/l_{37.5})$	.9106	(l_{55}/l_{35})
20-24	22.5	.8247	1.0860	0.9584	1.0283 (b)	.8956	$(l_{57.5}/32.5)$	.7904	$(l_{62.5}/l_{37.5})$	.8480	(l_{60}/l_{35})
25-29	27.5	.7607	1.1086	0.9062	1.0122 (b)	.8433	$(l_{62.5}/32.5)$	.6893	$(l_{67.5}/l_{37.5})$	.7700	(l_{65}/l_{35})
30-34	32.5	.5961	1.1110	0.8110	0.9673 (b)	.6623	$(l_{67.5}/32.5)$	.4834	$(l_{72.5}/l_{37.5})$	.5766	(l_{70}/l_{35})
35-39	37.5	.5083	1.0707 (b)	0.6306	0.8458	.5442	$(l_{72.5}/32.5)$	.3205	$(l_{77.5}/l_{37.5})$	.4297	(l_{75}/l_{35})
40-44	42.5	.3344	0.9261 (b)	0.4350	0.6574	.3097	$(l_{77.5}/32.5)$	.1455	$(l_{82.5}/l_{37.5})$	.2198	(l_{80}/l_{35})
45-49	47.5	.2173	0.7213 (b)	0.2401	0.4372	.1567	$(l_{82.5}/32.5)$	.0522	$(l_{87.5}/l_{37.5})$	.0950	(l_{85}/l_{35})
50-54	52.5	.1366	0.4703 (b)	0.0948	0.2167	.0642	$(l_{87.5}/32.5)$	.0129	$(l_{92.5}/l_{37.5})$	.0296	(l_{90}/l_{35})
55-59	57.5	.1059	0.2325			.0246	$(l_{92.5}/32.5)$				

TABLE 5.12.

MALE ADULT MORTALITY — ORPHANHOOD METHOD ($W(N)$)

Age of Respdt	Father Alive (1)	Father Dead (2)	Total (3)=(1)+(2)	Proportion with Father Alive (4)=(1)÷(3)	N	Weighting Factor M = 36.1, B = 37.5	$W(N) \cdot {}_5P_{N-5} + (1-W(N))\ {}_5P_N = \frac{l_{B+N+2.5}}{l_B}$
5-9	2412	56	2468	.9773			
					10	.392	(.392) x .9773 + (.608) x .9505 = .9610 ($l_{50}/l_{37.5}$)
10-14	1691	88	1779	.9505			
					15	.389	(.389) x .9505 + (.611) x .8913 = .9143 ($l_{55}/l_{37.5}$)
15-19	1074	131	1205	.8913			
					20	.337	(.337) x .8913 + (.663) x .8247 = .8471 ($l_{60}/l_{37.5}$)
20-24	762	162	924	.8247			
					25	.179	(.179) x .8247 + (.821) x .7607 = .7722 ($l_{65}/l_{37.5}$)
25-29	766	241	1007	.7607			
					30	−.026	(−.026) x .7607 + (1.026) x .5961 = .5918 ($l_{70}/l_{37.5}$)
30-34	515	349	864	.5961			
					35	−.341	(−.341) x .5961 + (1.341) x .5083 = .4764 ($l_{75}/l_{37.5}$)
35-39	276	267	543	.5083			
					40	−.609	(−.609) x .5083 + (1.609) x .3344 = .2285 ($l_{80}/l_{37.5}$)
40-44	205	408	613	.3344			
					45	−.744	(−.744) x .3344 + (1.744) x .2173 = .1302 ($l_{85}/l_{37.5}$)
45-49	98	353	451	.2173			
					50	−.733	(−.733) x .2173 + (1.733) x .1366 = .0774 ($l_{90}/l_{37.5}$)
50-54	66	417	483	.1366			
					55	−.593	(−.593) x .1366 + (1.593) x .1059 = .0877 ($l_{95}/l_{37.5}$)
55-59	25	211	236	.1059			

used with x=0.5. This was due to the fact that data were available for the total number of males in the age groups, 5-9 and 50-54; and also the population values had to be estimated from the beginning to the midpoint of each interval, i.e. for the age interval 10-14, the new age group was 10-12.5, therefore x=12.5-10.00÷5=0.5.

Using the value of x of 0.5, as a point of entry, for the Middle Age groups in Table D, values of A=0.0625, B=0.5000, and C=-0.0625 were selected (Carrier and Hobcraft, 1971, p. 204). A values were multiplied by the population in the preceding age interval, B by the population in the middle age interval, and C by the population in the succeeding age interval. The result was then added for each age group, and gave values from the beginning of each age group to its midpoint, i.e. 10-12.5 ; 15-17.5; 20-22.5 etc. Next the population was worked out for between the midpoints of two age groups, i.e. for 12.5-17.5=(15-17.5)+(10-14)-(10-12.5) and so on (Table 5.14.A; Table 5.14.B).

The number of first marriages was obtained by the multiplication of the rate and the adjusted population between the midpoint of two age groups, and the population mean age at first marriage was 24.39 years (Table 5.13). This was lower than the male mean age at first marriage of 25.69, calculated by the direct method (Table 5.10.E).

Female mean age at first marriage: The mean age at marriage for females was estimated by the Hajnal method. The upper limit was taken at 45 years. The proportion single was added up to age group 40-45 and multiplied by five. This gave the number of total single years for a 100 girls from birth of 2013.85. From this was subtracted 102.15, the years lived by those who never married up to age 45, in order to obtain the number of unmarried years by those who married. This was 1911.15 and was divided by 97.73, i.e. those who had married by exact age 45. The singulate mean age at marriage was 19.56 years (Table 5.15). This was very similar to the mean age of first marriage of 19.46 years (Table 5.10.E).

The female mean age at first marriage determines the estimating function to be used. Since the mean age at first marriage was below 20, the weights relevant to base age 22.5 were used. The male mean age of 24.39 determined the point of entry into the relevant part of the table (Hill, 1977, Table I, p. 89). By linear interpolation the values for the central age N of women, for mean age of female marriage of 18 years, and male mean of 24.4, were obtained. However, the singulate mean age at marriage was 19.56 years, so it was necessary to adjust the weights. This was done by means of a correction factor of -0.3120, obtained by linear interpolation(Ibid., Table 2, p. 79). The correction factor was added to each weight to obtain the relevant factors for mean age at female marriage of 19.56. The weights were then applied to the proportions not widowed in the two adjacent age groups, according to the estimating equation for converting proportions not widowed into life table probabilities of surviving (Table 5.16.A; 5.16.B; 5.16.C; 5.16.D).

Table 5.16.A.

The Estimation of ~~Male~~ Adult Mortality from Widowhood
Female Respondents

Age group of Respondent	Married Women with husbands Alive	Dead	Total (2)+(3)	Proportion Not Widowed (2) ÷ (4)	N	W_N	$\frac{l_{N+5}}{l_{22.5}} = W_N \cdot {}_5P_{N-5} + (1-W_N) \cdot {}_5P_N$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
20-24	351	3	354	0.9915			
					25	·1312	$l_{30}/l_{22.5} = (\cdot1312 \times \cdot9915 + \cdot8688 \times \cdot9953) = 0.9948$
25-29	432	2	434	0.9953			
					30	·2045	$l_{35}/l_{22.5} = (\cdot2045 \times \cdot9953 + \cdot7955 \times \cdot9789) = 0.9823$
30-34	417	9	426	0.9789			
					35	·2858	$l_{40}/l_{22.5} = (\cdot2858 \times \cdot9789 + \cdot7142 \times \cdot9529) = 0.9603$
35-39	263	13	276	0.9529			
					40	·3666	$l_{45}/l_{22.5} = (\cdot3666 \times \cdot9529 + \cdot6334 \times \cdot9097) = 0.9255$
40-44	262	26	288	0.9097			
					45	·4320	$l_{50}/l_{22.5} = (\cdot4320 \times \cdot9097 + \cdot5680 \times \cdot9111) = 0.9105$
45-49	205	20	225	0.9111			
					50	·4689	$l_{55}/l_{22.5} = (\cdot4689 \times \cdot9111 + \cdot5311 \times \cdot7981) = 0.8511$
50-54	170	43	213	0.7981			
					55	·4960	$l_{60}/l_{22.5} = (\cdot4960 \times \cdot7981 + \cdot5040 \times \cdot7881) = 0.7931$
55-59	93	25	118	0.7881			
					60	·4679	$l_{65}/l_{22.5} = (\cdot4679 \times \cdot7881 + \cdot5321 \times \cdot5856) = 0.6803$
60-64	106	75	181	0.5856			
					65	·4282	$l_{70}/l_{22.5} = (\cdot4282 \times \cdot5856 + \cdot5718 \times \cdot6000) = 0.5938$
65-69	45	30	75	0.6000			

Table 5.17.A.

The Estimation of Female Adult Mortality from Widowhood
Male Respondents

Age Group of Respondent	Male with Alive	Respondent wife Dead	Total (2)+(3)	Proportion Not Widowed (2)÷(4)	N	W_N	$\frac{l_{N-5}}{l_{17.5}} = W_N \cdot {}_5P_{N-5} + (1-W_N) \cdot {}_5P_N$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
15-19	32	3	35	·9143			
20-24	157	1	158	·9937	20		
25-29	371	5	376	·9867	25	·2549	$l_{20}/l_{17.5} = (\cdot 2549 \times \cdot 9937) + (\cdot 7451 \times \cdot 9867) = \cdot 9885$
30-34	359	7	366	·9809	30	·0658	$l_{25}/l_{17.5} = (\cdot 0658 \times \cdot 9867) + (\cdot 9342 \times \cdot 9809) = \cdot 9813$
35-39	240	5	245	·9796	35	·1056	$l_{30}/l_{17.5} = (\cdot 1056 \times \cdot 9809) + (\cdot 8944 \times \cdot 9796) = \cdot 9797$
40-44	288	19	307	·9381	40	·1830	$l_{35}/l_{17.5} = (\cdot 1830 \times \cdot 9796) + (\cdot 8170 \times \cdot 9381) = \cdot 9457$
45-49	196	23	219	·8950	45	·2717	$l_{40}/l_{17.5} = (\cdot 2717 \times \cdot 9381) + (\cdot 7283 \times \cdot 8950) = \cdot 9067$
50-54	228	31	259	·8803	50	·3619	$l_{45}/l_{17.5} = (\cdot 3619 \times \cdot 8950) + (\cdot 6381 \times \cdot 8803) = \cdot 8856$
55-59	98	17	115	·8522	55	·4382	$l_{50}/l_{17.5} = (\cdot 4382 \times \cdot 8803) + (\cdot 5618 \times \cdot 8522) = \cdot 8645$
60-64	151	45	196	·7704	60	·4868	$l_{55}/l_{17.5} = (\cdot 4868 \times \cdot 8522) + (\cdot 5132 \times \cdot 7704) = \cdot 8102$
65-69	58	17	75	·7733	65	·5253	$l_{60}/l_{17.5} = (\cdot 5253 \times \cdot 7704) + (\cdot 4747 \times \cdot 7733) = \cdot 7718$

Col (7) see Tables 5.17.B, 5.17.C, 5.17.D.

Female mortality: Female mortality was estimated from information on widowhood by male respondents. In this case, the male first marriage distribution determines the exposure to risk, and the female first marriage distribution determines the level of risk.

Weights were selected on the basis of the male singulate age at marriage of 24.80 years. Since this was below 25 years, the weights relevant to the base age 17.5 were used. The female population weighted mean age of 20.19 determined the point of entry into the relevant part of the table (Ibid., Table 3 a, p. 81). By linear interpolation the values for the central age N of men, for the mean age at male marriage of 23 years, were calculated. In order to obtain weights for the singulate mean age at male marriage of 24.80 years, an adjustment was made by means of a correction factor of -0. 36 (Ibid., Table 4, p.81). The weights were then applied to the proportions not widowed in the two adjacent age groups , according to the estimating equation, to obtain life table probabilities of surviving (Table 5.17.A; 5.17.B; 5.17.C;5.17.D).

5.3.4 Adult mortality from siblings

The siblings method was developed to estimate adult mortality from information on siblings' survival. The theoretical model is explained in Annex 5.7.4.

Male mortality was estimated by converting the proportion of surviving brothers into life table probabilities of surviving according to the estimating equation:

$$l_N = a + b \ {}_5S_N$$

where N is the lower limit of the age interval. Similar estimates were derived for female mortality from the proportion of sisters surviving by age of respondent.

Table 5.18

Male Adult Mortality — Siblings.
(Brother Alive / Dead)

Age Group	Brother Alive	Brother Dead	Total	Proportion Surviving	N lower limit age interval	$_5S_N$	$l_N = a + b._5S_N$
(1)	(2)	(3)	(2)+(3)=(4)	(2)÷(4)=(5)	(6)	(7)	(8)
0-4	4293	1012	5305	·8092	—		
5-9	5854	1402	7256	·8068	—		
10-14	4764	1231	5995	·7947	10	·7947	l_{10} = ·0033 + ·998 x ·7947 = ·7978
15-19	3303	885	4188	·7887	15	·7887	l_{15} = ·0223 + ·9839 x ·7857 = ·7983
20-24	2525	813	3338	·7564	20	·7564	l_{20} = ·0216 + ·9847 x ·7564 = ·7664
25-29	2591	942	3533	·7334	25	·7334	l_{25} = ·0129 + ·9920 x ·7334 = ·7404
30-34	2033	803	2836	·7169	30	·7169	l_{30} = ·0102 + ·9954 x ·7169 = ·7238
35-39	1212	513	1725	·7026	35	·7026	l_{35} = ·0115 + ·9972 x ·7026 = ·7121
40-44	1160	569	1729	·6709	40	·6709	l_{40} = ·0134 + 1·0009 x ·6709 = ·6849
45-49	776	443	1219	·6366	45	·6366	l_{45} = ·0143 + 1·0090 x ·6366 = ·6566
50-54	768	589	1357	·5660	50	·5660	l_{50} = ·0125 + 1·0242 x ·5660 = ·5922
55-59	340	362	702	·4843	55	·4843	l_{55} = ·0075 + 1·0488 x ·4843 = ·5179

N.B. l_{15} is greater than l_{10}.

Table 5.19

Female Adult Mortality — Siblings. (Sister Alive / Dead)

Age Group	Sister Alive	Sisters Dead	Total	Proportion Surviving	Lower limit Age Interval	${}_5S_N$	$l_N = a + b \cdot {}_5S_N$
(1)	(2)	(3)	(2)+(3)=(4)	(2)÷(4)=5	(6)	(7)	(8)
0-4	3796	846	4642	—	—	—	
5-9	5193	1179	6372	·8150	—	—	
10-14	4300	1075	5375	·8000	10	·8000	$l_{10} = ·0033 + ·9998 \times ·8000 = ·8031$
15-19	2945	696	3641	·8088	15	·8088	$l_{15} = ·0223 + ·9839 \times ·8088 = ·8181$
20-24	2213	590	2803	·7895	20	·7895	$l_{20} = ·0216 + ·9847 \times ·7895 = ·7990$
25-29	2233	660	2893	·7719	25	·7719	$l_{25} = ·0129 + ·9920 \times ·7719 = ·7786$
30-34	1802	623	2425	·7431	30	·7431	$l_{30} = ·0102 + ·9954 \times ·7431 = ·7499$
35-39	988	435	1423	·6943	35	·6943	$l_{35} = ·0115 + ·9972 \times ·6943 = ·7039$
40-44	1013	531	1544	·6561	40	·6561	$l_{40} = ·0134 + 1·0009 \times ·6561 = ·6701$
45-49	733	479	1212	·6048	45	·6048	$l_{45} = ·0143 + 1·0090 \times ·6048 = ·6245$
50-54	704	487	1191	·5911	50	·5911	$l_{50} = ·0125 + 1·0242 \times ·5911 = ·6179$
55-59	307	219	526	·5837	55	·5837	$l_{55} = ·0075 + 1·0488 \times ·5837 = ·6197$

N.B. l_{15} is greater than l_{10} and l_{55} is greater than l_{50}.

5.4 CALCULATION OF α AND β

In the logit system any two life tables are linearly related on the logit scale: $\text{logit}(1-l_x) = \alpha + \beta\,\text{logit}(1-l_x^s)$; therefore, given the value of one life table and alpha and beta, the other can be calculated.

The value of beta, which is the slope of the curve, was calculated by two methods: by comparing e_x values derived from orphanhood data with model life tables (Blacker, 1977, pp. 111-127); and by working out implied values of beta from a known value of l_2 and adult survivorship ratios, expressed by the equation: $\hat{\beta} = \text{logit}(1-l_2)-\text{logit}(1-l_x) / \text{logit}(1-l_2^s)-\text{logit}(1-l_x^s)$, the final estimate of $\hat{\beta}$, which an averege over a certain range of ages, is worked out by a trial and error process. The value of β determines the value of α, expressed by the equation: $\text{logit}(1-l_2) = \alpha + \beta\,\text{logit}(1-l_2^s)$. With the values of α and β, and using the Brass general standard, the whole life table can thus be determined. (Brass and Hill, 1973, pp. 118-120; Hill and Trussell, 1977, p. 316 and p. 330). The tables to this section are given in Annex 5.7.4.

5.4.1 β by comparison of e_x to e_x^s (orphanhood)

β was calculated by comparison of e_x values derived from orphanhood data with model life tables.

Males: The series of estimates of $l_{37.5+N+2.5}/l_{37.5}$ were converted into l_x values. This was done by assuming $l_{37.5} = 10000$, and working out the values of l_x. The advantage of taking $l_{37.5}$ to be a 10000 was that l_x can be obtained by removing the decimal from the values of l_{x+N}/l_x.

The ${}_5L_x$ values were obtained by the equation $\frac{n}{2}$ (l_x+l_{x+5}). The values of l_{90} and l_{95} were ignored, because l_{95} was greater than l_{90}; and the Blacker tables do not provide values of e_{90} . It is reasonable to assume that the increasing trend observed in these values is due to the small numbers in the age group 55-59, i.e. 236, and also in age groups 45-49 and 50-54, compared to the younger age group; or due to age misreporting.

This left three choices to arrive at an estimate of e_{85}: by the method of iteration, starting with a value of β of 1.0 and of l_2 of .815 and arriving at a better estimate of β to estimate e_{85}, this process is continued until a stable value of β is obtained; by assuming l_{100} to be equal to 0, to calculate ${}_{10}L_{90}$; or by assuming e_{80} for males equal to e_{80} for females derived by the equation e_{80}= a+b P_{55+} + c $(P_{55+})^2$.

In the estimation of β the value of l_2 of 0.815, derived by the Brass method was used. The Sullivan equation value of .811 was very close to the value derived by the Brass method. i.e. they were mutually supportive. However, as the logit model life tables have l_2 values varying at intervals of five, it was more convenient to take the value derived by the Brass method, although it has been suggested that errors in the data are such that they lead to an underestimate rather than an overestimate of mortality, and therefore the lower values of l_2 should be adopted (Blacker, 1977, p. 111).

In order to obtain the estimates of β above the different ages, the e_x values derived from the data were compared to those of the logit model life table, with l_2 equal to 0.815, and β was calculated by linear interpolation to two decimal places. This was necessary because the relationship between e_x and β is not strictly linear, but estimates are normally correct to the second place (Ibid., p. 111, footnote 2).

The estimates of β for $e_{37.5}$ were below 0.70. This is usually attributed to the under-reporting of dead parents of young children (Ibid., p.115). The estimates of β for the older ages were erratic, but on the whole they were consistent.

The iterative process gave a stable value of β after the second stage. In other words, β was assumed to be 0.80 to get a value of e_{25}. This was the average value of β obtained from the first set of calculation, and the estimated value of β was 0.77 (Table 5.20.A; 5.20.B). The approach which assumed l_{100} to be 0, to calculate $_{10}L_{90}$ to estimate T_{90}, also gave values of B between 0.7 and 0.8 (Table 5.20.C). It was not considered necessary to calculate e_{80} according to the third method, because with the second iteration e_{80} for males was equal to 6.35, which was very close to the female estimate of 6.42.

All evidence indicated β to be 0.77. This compared very favourably with β of 0.76 for females. Therefore it was decided to take β equal to 0.76 for males, and α was calculated according to the estimating equation and was -0.1978(Table 5.20.B).

Females: The estimation of β for females followed the same process; the only difference was in the estimation of e_{80}, which was calculated according to the equation:

$e_{80} = a + b\ P_{55+} + c\ (P_{55+})^2$. The value 6.42 determined the calculation of T_{80}, according to the relationship $e_{80} = l_{80}\ e_{80}$. It has been observed that the estimates of e_{80} derived from this method sometimes give implausibly high values. Therefore, mortality is more likely to be underestimated by this method (Ibid., p. 127).

The comparison of the e_x values from the data with the logit modal life table, with l_2 of 0.845 (0.841, according to the Sullivan equation), gave estimates of β for the different ages. The estimates of β based on e_x's for the younger ages and the older ages were low, i.e. below 0.72, but for the age range 40 to 70 they were very consistent. The average estimate of β was 0.76, and this gave the value of α of -0.3044 (Table 5.21. A; 5.21.B).

5.4.2 β by the iterative process

β was estimated from a known value of l_2 and adult survivorship ratios, expressed by the equation: β= logit $(1-l_2)$-logit $(1-l_x)$ / logit $(1-l_2^s)$-logit $(1-l_x^s)$. The average value was compared to the assumed value and the process was continued until a stable value of β was obtained.

A. Widowhood data

The same method was used to estimate β from widowhood information.

Males: The l_{N+5} / $l_{22.5}$ survivorship ratios obtained by the widowhood method were converted into l_x's. This was done by calculating the value for $l_{22.5}$. The first estimate of $l_{22.5}$ was obtained with β equal to 1.0. The values of l_{22} and l_{23} were obtained, with l_2 of 0.815 and β of 1.0, according to the equation: $\{\text{logit } (1-l_x)\text{-logit } (1-l_2)\} = \beta \{\text{logit } (1-l_x^s)\text{-logit } (1-l_2^s)\}$; l_{22} and l_{23} were then added and divided by two in order to obtain $l_{22.5}$. This value was multiplied by l_{N+5} / $l_{22.5}$ for the l_x's.

The next step involved the estimation of β, from each l_x and the value of l_2, by the equation: β= logit $(1-l_x)$-logit $(1-l_2)$ / logit $(1-l_x^s)$-logit $(1-l_2^s)$. The first estimate of β is usually taken as an average over a range of estimates based on the reports of the most reliable age group of respondents (Brass, 1975, p. 105). If $\hat{\beta}_{65}$ and $\hat{\beta}_{70}$ are considered the average would be 0.71. However, in the first iteration β was estimated at 0.75 from $\hat{\beta}_{30}$ and $\hat{\beta}_{35}$, based on responses from the age group 20-29 and 25-34.

For the second iteration process $l_{22.5}$ was calculated with a β of 0.75 and this gave an estimate of β equal to 0.665, the average of $\hat{\beta}_{65}$ and $\hat{\beta}_{70}$. The third iteration was started with β equal to 0.67, and the average based on $\hat{\beta}_{65}$ and $\hat{\beta}_{70}$ was 0.663. A β of 0.66 was considered the best estimate, and this determined the value of α of -0.267 (Table 5.22.A; 5.22.B; 5.22.C).

Females: In the case of females the $l_{N-5}/l_{17.5}$ were converted into l_x's by determining the value of $l_{17.5}$. This was calculated, as in the case of males, with a β of 1.0 and l_2 of 0.845. The $\hat{\beta}$'s were then estimated for the different ages. In the first iteration β was estimated at 0.734, the average for the age range 40-60. The overall average was 0.76. The second iteration was carried out with a β of 0.76, and the average for the age range 45-60 was 0.68. This determined the value for the third iteration, and gave an average for the age 40 to 60 of 0.664 or 0.66. The value of α was calculated at -0.376 (Table 5.23.A; 5.23.B; 5.23.C).

The β estimates for both males and females were more consistent in the later ages; therefore it could be concluded that the 40-60 age group of respondents was the most reliable, i.e. $\hat{\beta}_{40}$ to $\hat{\beta}_{60}$.

B. Siblings data

β was calculated from siblings data according to the same method used for widowhood data.

Males: Unlike the widowhood data where the survivorship probabilities are converted into l_x's, using l_2 and an estimated value of $l_{22.5}$ based on an assumed value of β, the proportions with surviving siblings are in the form of l_x's. The β for the range of ages was calculated according to the β estimating equation (Chapt. 5, Sec. 5.4.1.B). $\hat{\beta}_{10}$ and $\hat{\beta}_{15}$ were not considered, because l_{15} was greater than l_{10}. The values showed an increasing trend with age. The average for the age range 20-55 was 0.69, and α was calculated at -0.248.

Females: In the case of females the estimates of $\hat{\beta}_{10}$, $\hat{\beta}_{15}$, $\hat{\beta}_{50}$ and $\hat{\beta}_{55}$ were not considered, because l_{15} was greater than l_{10}; and l_{55} greater than l_{50}. As in the case of males, the values showed an increasing trend with age. The average for $\hat{\beta}_{20}$ to $\hat{\beta}_{30}$ was 0.67. This was not consistent with the male estimate. The value of α obtained was -0.369.

5.5 DISCUSSION OF RESULTS

The results were examined in terms of the implications of β less than 1.0; the life tables according to the standard methods; the examination of mortality estimates and the construction of the final life table.

5.5.1. $\beta < 1.0$

The Brass logit model life tables are mathematically derived. Their flexibility is determined by β. The α denotes the general level of mortality, whereas β determines the relationship between adult mortality and childhood mortality. When β has the central value of 1.0, then $\text{logit}(1-l_x) = \alpha + \beta\ \text{logit}(1-l_x^s)$ behaves like a single parameter life table set, $\text{logit}(1-l_x) = \alpha + \text{logit}(1-l_x^s)$, i.e. the different life tables are generated by varying α, after fixing the standard to be used.

A. Implications of $\beta < 1.0$ for adult ages

The values of β obtained from the orphanhood, widowhood and siblings data were all < 1.0. In the adult ages, if β is less than 1.0, the q_x's, derived from the equation $\text{logit}(1-l_x) = \alpha + \beta_{<1.0}\, \text{logit}(1-l_x^s)$, are lower than those for the corresponding adult ages of the life table with β of 1.0. Therefore, it would appear that adult mortality is lower, for both males and females, in relation to infant and childhood mortality, than would have been inferred from the use of a single parameter life table, i.e. adult mortality is lower in relation to infant and early childhood mortality compared with the mortality pattern of a model life table of the same level of mortality (e_0^o).

B. Implications of $\beta < 1.0$ for older ages

In the Brass General Standard, $\text{logit}(1-l_x^s)=0$, for x between 51 and 52. Therefore, for x of 51.1 years, the values of logit $(1-l_x)$ are the same for the same α, whatever value of β is used, because $\text{logit}(1-l_x) = \alpha + \beta \times 0$, where 0 represents logit $(1-l_x^s)$ for 51.1 years, i.e. $l_{51.1}$ is the same for all life tables which have the same α, whatever the value of β.

When β is less than 1.0, the mortality represented by the q_x's or the ASMR in the older ages, i.e. above 51.1 years, is lower when compared to the single parameter model life table with the same α and β of 1.0.

5.5.2 Life tables from standard methods

The indices used for determining sex-differential mortality were the comparison of the e_o^o , and the equivalents of the age-specific death rates in the life table, the $_nq_x$'s , derived from the four life tables that had been constructed from orphanhood, widowhood, siblings data, and the combined value of β obtained from these sources. Tables are given in Annex 5.16

A. The e_o^o's

The expectation of life at birth was 50.2 years for males and 53.9 years for females according to the orphanhood data; the corresponding values for data derived from widowhood, siblings, and the combined method were 53.1 and 56.9 years; 52.2 and 56.6 years; and 51.9 and 55.7 years respectively.The greatest difference recorded of 4.4 years was in the life table derived from siblings data. This advantage of females at birth was maintained at all ages.

B. The sex ratio of the $_nq_x$'s

The ratios of the $_nq_x$'s , i.e. $_nq_x$-M/$_nq_x$-F, also manifested a higher mortality for males at all ages. There was a decreasing trend in the advantages of females with age in all the life tables calculated. The siblings data not only recorded the highest differential at all ages, but also showed a less steady decline than the ratios of the $_nq_x$'s derived from the other life tables, which showed values very close to each other. The striking feature about these ratios was that the female advantage was even maintained in the reproductive period (Table 5.26.A to 5.29.B).

5.5.3 Mortality estimates examined

The life tables from the conventional methods did not highlight the idiosycrasies of the sex-differentials in the population at the different ages. Therefore, it was necessary to first examine the mortality estimates from the different methods and adopt an eclectic approach in the construction of the final life table.

A. Childhood mortality by age of mother

The l_2 values, of 0.815 for males and 0.845 for females used, to determine α for the construction of the life tables from data on orphanhood, widowhood and siblings status, were based on the reports of mothers aged 20-24. The differential observed between the sexes could have largely been due to chance effect because of the small numbers in any one particular age group. Therefore, in comparing the sexes, it was necessary to work with broader age groups of mothers to reduce the sample errors of small numbers. Since the sex ratio at birth is almost constant, the exposure to risk for male and female infants is the same.

The most reliable age group, the under 30s, showed an equal number of proportion of children dead for the two sexes. At later ages females developed an advantage, which seemed high for mothers 50-64. It is important to note the substantial excess of male births reported particularly for this age group (Table 5.30). This suggests omissions of female children with a high probability that the dead are under-reported more often than the living.

In the light of these observations, the most satisfactory conclusion to be drawn was that male and female child mortality was the same.

Table 5.30

Proportion of Children Dead by Age of Mother

Age of Mother	MALES Born	MALES Proportion Dead	FEMALES Born	FEMALES Proportion Dead
Under 30	1060	·1717	872	·1709
30-39	1916	·1926	1725	·1786
40-49	1832	·2085	1591	·2024
50-64	1835	·2774	1474	·2266

B. Mortality beyond childhood

The estimates of mortality after childhood from orphanhood and widowhood had bases at different ages. In order to compare the values from the different methods provisional estimates of mortality up to the base ages were required. This involved the selection of the North 14 life table from the Coale and Demney models. This life table was chosen because it had childhood mortality at the level found in the observed data and the characteristics of relatively low adult compared to childhood mortality which was also indicated by the data. The same model life table was used for males and females because the present purpose was to make comparisons between the sexes on an equivalent basis (Table 5.31).

Ages 10-30 years from deaths of children and siblings: The mortality estimates from siblings and child deaths showed reasonably good average agreement, although individual values were erratic. Female survivorship showed an advantage relative to males at almost all ages from 10 to 30, excluding ages 10 and 20 in the childhood method (Table 5.32). This could be a real effect caused by a higher number of male deaths from violence or could be attributed to sex-differential omissions. Omissions have already been discussed with regard to the reports of mothers (5.5.3.A), and the same factors are pertinent in the case of siblings. The mean number of sisters reported, for all ages above 10, was substantially lower than the mean number of brothers (Table 5.33). The evidence on fertility showed that it should be around 3.5 to 3.6 (Table 5.3). Brothers, on the other hand, appeared to have been well reported to age 30 of the respondent, after which there was a marked deterioration. The sex discrepancies in reporting were

TABLE 5.31

PROVISIONAL ESTIMATES OF MORTALITY

COALE AND DEMNEY MODEL NORTH LEVEL 14

STANDARDIZE .8 at 10	MALES	Ages	FEMALES	STANDARDIZE .8 at 10
8000	7887	10	8086	8000
7853	7742	15	7939	7855
7677	7569	20	7780	7698
7433	7328	25	7596	7515
7186	7085	30	7388	7310
6931	6833	35	7155	7079
6654	6560	40	6898	6825
6334	6245	45	6616	6546
5966	5882	50	6315	6248
5514	5436	55	5948	5885

TABLE 5.32

COMPARISON OF l_x's FROM WIDOWHOOD, SIBLINGS ORPHANHOOD AND CHILDHOOD DATA

Age	WIDOWHOOD MALES $l_{22.5} = 0.7555$	WIDOWHOOD FEMALES $l_{17.5} = 0.7776$	SIBLINGS MALES	SIBLINGS FEMALES	ORPHANHOOD MALES $l_{37.5} = 0.6793$	ORPHANHOOD FEMALES $l_{25} = 0.7515$	CHILDHOOD MALES	CHILDHOOD FEMALES
10			.7978	.8031			.8119	.7993
15			.7983	.8181			.8084	.8268
20		.7687	.7664	.7990			.7788	.7711
25		.7631	.7404	.7786			.7760	.8379
30	.7516	.7618	.7238	.7499			.7137	.7582
35	.7421	.7354	.7121	7039		.7344	.6704	.7075
40	.7255	.7051	.6849	6701		.7214		
45	.6992	.6886	.6566	.6245	(.6631)	.7025		
50	.6879	.6722	.5922	6179	.6528	6900		
55	.6430	.6300	.5179	.6197	.6211	.6698		
60	.5992	.6002			.5754	.6121		
65	.5140				5246	.5079		
70	.4486				.4020	.4366		
75					.3250	.3215		
80					1552	2154		
85					.0884	1007		

TABLE 5.33

Mean Number of Brothers and Sisters by Sex of Respondent

Age group of Respdt	Male Respdts	Total Brothers Alive and Dead	Total Sisters Alive and Dead	Female Respdts	Total Brothers Alive and Dead	Total Sisters Alive and Dead	Mean Brothers Males	Mean Brothers Females	Mean Sisters Males	Mean Sisters Females
10-14	1001	3295	3007	778	2700	2368	3.29	3.47	3.00	3.04
15-19	641	2228	2004	564	1960	1637	3.48	3.48	3.13	2.90
20-24	475	1713	1457	449	1625	1346	3.61x	3.62x	3.07	3.00
25-29	534	1903	1541	473	1630	1352	3.56	3.45	2.89	2.86
30-34	425	1440	1187	439	1396	1238	3.39	3.18	2.79	2.82
35-39	257	877	685	286	848	738	3.41	2.97	2.67	2.58
40-44	318	951	766	295	778	778	2.99	2.64	2.41	2.64
45-49	221	596	533	230	623	679	2.70	2.71	2.41	2.95
50-54	262	691	583	221	616	608	2.64	3.01	2.23	2.75
55-59	117	316	271	119	386	255	2.70	3.24	2.32	2.14

particularly evident at ages 25 and 30 (Table 5.33). Therefore, it could be inferred that there was a differential omission in the reporting of dead sisters.

Ages 30-45 from siblings and widowhood: The siblings data showed a lower survivorship than the widowhood data. This could be the result of a higher child mortality in the past when the brothers and sisters of the respondent were born. The widowhood estimates were considered preferable to those of the siblings for current mortality, because they were not distorted by past trends in childhood mortality. The estimates from both sources manifested a higher female mortality relative to males between the ages of 35 to 45 (Table 5.32).. This female disadvantage was evident despite the fact that the reports on the deaths of husbands from widows would be better than vice versa (Chapt.5, Sec. 5.2.2.B). Therefore, it is reasonable to conclude that female mortality is relatively higher and could probably be attributed to deaths in childbirth.

Ages 45-60 from widowhood and orphanhood: The partial siblings data for these ages was considered suspect because of the evidence of severe under-reporting of brothers and sisters born, and probable errors in the proportions dead (Table 5.33). Furthermore, the orphanhood estimates for mothers are usually considered to be distorted at the younger ages of the respondent by the 'adoption' effect. Subsequently the substantially higher female than male survivorship at age 45 was considered unreliable. However, the proportions dying between 45 to 60 were about equal for the two sexes. Similar patterns of survivorship were manifested in the widowhood estimates. As a result, it was concluded that male and female mortality was more or less the same as shown by the more consistent evidence from widowhood.

Ages 60 to 75 from orphanhood: Survivorship from 60 to 75 was higher for males than for females (Table 5.32). Although this could be the result of the better reporting of mother's deaths and age error effects, there is no reason to completely discount this evidence which could partially offset the underestimation of female mortality at other periods of life.

Ages 75 and over from orphanhood: The oldest age groups showed a marked female advantage (Table 5.32). However, the estimates for males were considered unreliable at these ages because they depend so critically on the number of children born to husbands who are considerably older than their wives, and the model on which the calculations were based is not a good representation of this situation.

5.5.4 Final life table

The life table was first constructed and the deaths by cause estimated, after which comparisons were made with results from other studies.

A. Construction of the life table

Fitting: The sections of the mortality estimates regarded as the most reliable in each phase of life were used to construct the final life table. The observed measures, however, were too erratic to be used directly and it was necessary to apply some form of smoothing. It would have been complicated to do this over the whole life table, therefore the following simple approach was adopted.

A selection was made, for each section of life and sex, of model life table probabilities of surviving which best represented the observed values, and these were used instead of the observed values. The sections were then joined together to give the l_x column of the life table. The model system used was the one parameter Carrier and Hobcraft, based on the logit relationship. One parameter was considered sufficient for fitting short sections. These model life tables were only tabulated at broad intervals of life expectancy; refinement in fitting was not considered justifiable because of the erratic fluctuations from age to age. The best choice from the levels tabulated was made without interpolation, except in the case of the age range 60 to 75. The choice of levels for each sex showed a reasonable consistency of levels beyond childhood. It is not unusual for childhood mortality to be at a different level on a one parameter system. It is such variations that the β parameter of the logit system measures. The levels for each sex and age range which provided the best fit are listed below:

Age range	Method	Males	Females
0-10	Childhood (the two sexes together from proportions dead by age of mother).	55 for both sexes	
10-30	Siblings	60	80
30-45	Widowhood	85	65
45-60	Widowhood	85	85
60-75	Orphanhood	75	Average 80 and 85(best fit fell between the two).
75+	To complete the life table with little evidence the level 80 was assumed for both sexes(Table 5.35).		

TABLE 5.35

SELECTION OF MODEL LIFE TABLE PROBABILITIES OF SURVIVING TO REPRESENT OBSERVED VALUES

$q_{(1)}$	Both Sexes	Level 55 Carrier and (✓)	Level 50 Hobcraft	North 14 Average Males and Females
$q_{(2)}$	·1705	·1362	·1551	
$q_{(3)}$	·1657	·1561	·1772	
$q_{(5)}$	·1810	·1766	·1902	·1709
$q_{(10)}$	·1942	·2081	·2343	·1979

10 – 30

l_{x+10}/l_{10} BASE 10	SIBLINGS MALES	FEMALES	CARRIER AND HOBCRAFT 60 (✓)	75	80 (✓)
15	1·0006	1·0187	·9862	·9910	·9924
20	·9606	·9949	·9630	·9757	·9796
25	·9281	·9695	·9321	·9548	·9620
30	·9072	·9338	·9008	·9332	·9436

30 – 45

l_{x+30}/l_{30} BASE 30	WIDOWHOOD MALES	FEMALES	CARRIER AND HOBCRAFT 65 (✓)	70	85 (✓)
35	·9874	·9654	·9684	·9720	·9829
40	·9653	·9256	·9331	·9407	·9633
45	·9303	·9039	·8923	·9040	·9397

50 – 60

l_{x+45}/l_{45} BASE 45	WIDOWHOOD MALES	FEMALES	CARRIER AND HOBCRAFT 85 (✓)
50	·9838	·9762	·9677
55	·9196	·9149	·9239
60	·8570	·8716	·8639

65 – 75

l_{x+60}/l_{60} BASE 60	ORPHANHOOD MALES	FEMALES	CARRIER AND HOBCRAFT 75 (✓)	80	82·5 (✓)	85
65	·9117	·8298	·8702	·8842	·8914	·8987
70	·6986	·7133	·7029	·7295	·7438	·7579
75	·5648	·5252	·4938	·5263	·5448	·5634

80 – 85

l_{x+75}/l_{75} BASE 75	ORPHANHOOD MALES	FEMALES	CARRIER AND HOBCRAFT 89 (✓)
80	·4775	·6700	·5727
85	·2720	·3132	·2250

The results: The life table showed some anomalies, i.e. the ${}_np_x$ values for males were erratic and did not decrease systematically with age. This could have been the result of the method used for constructing the life table.

However, there is no absolute rule that mortality should rise in a particular way with age. In other populations similar humps have been observed when deaths have occurred due to unnatural causes, i.e. accidents, violence etc. The ${}_nq_x$ values for males showed that male mortality in the early twenties was higher than at later ages. It was not clear what rule should be applied to eliminate this effect, therefore the data was left with the irregularities it manifested.

The expectation of life at birth was 52.53 years for males and 52.52 years for females. This equality was maintained at almost all ages, except the reproductive ages of 20-45 (Table 5.36).

The sex ratios of the ${}_nq_x$'s manifested an equality at the ages 0 to 5, 45 to 55 and 75 and over. Males showed a relative disadvantage at ages 10 to 25 and females ex-perienced higher mortality from 30 to 40 and 60 to 70 (Fig. 40).

B. Deaths by cause

Deaths by cause were analyzed according to the orphanhood and widowhood method.

Maternal orphanhood by cause: This method consisted in assuming that the mother on an average was exactly 30 years older than the children. This assumption was considered sufficient for practical purposes.

TABLE 5.36
LIFE TABLE

	MALES						FEMALES					
x	$_nq_x$	$_np_x$	l_x	L_x	T_x	e_x	$_nq_x$	$_np_x$	l_x	L_x	T_x	e_x
0	·0970	·9030	10,000	9515	525332	52·53	·0970	·9030	10,000	9515	525151	52.52
1	·0434	·9566	9030	8834	515817	57·12	·0434	·9566	9030	8834	515636	57·10
2	·0230	·9770	8638	8539	506983	58·69	·0230	·9770	8638	8539	506802	58·67
3	·0140	·9860	8439	8380	498444	59·06	·0140	·9860	8439	8380	498263	59·04
4	·0105	·9895	8321	8278	490064	58·89	·0105	·9895	8321	8278	489883	58·87
5	·0383	·9617	8234	40383	481786	58·51	·0383	·9617	8234	40383	481605	58·49
10	·0138	·9862	7919	39323	441403	55·74	·0076	·9924	7919	39445	441222	55·72
15	·0236	·9764	7810	38590	402080	51·48	·0130	·9870	7859	39040	401777	51·12
20	·0321	·9679	7626	37518	363490	47·66	·0179	·9821	7757	38438	362737	46·76
25	·0336	·9664	7381	36285	325972	44·16	·0192	·9808	7618	37725	324299	42·57
30	·0171	·9829	7133	35360	289687	40·61	·0316	·9684	7472	36770	286574	38·35
35	·0200	·9800	7011	34705	254327	36·28	·0365	·9635	7236	35520	249804	34·52
40	·0245	·9755	6871	33935	219622	31·96	·0437	·9563	6972	34098	214284	30·73
45	·0324	·9676	6703	32973	185687	27·70	·0322	·9678	6667	32798	180186	27·03
50	·0452	·9548	6486	31698	152714	23·55	·0453	·9547	6452	31530	147358	22·84
55	·0649	·9351	6193	29960	121016	19·54	·0649	·9351	6160	29800	115858	18·81
60	·1086	·8914	5791	27383	91056	15·72	·1299	·8701	5760	26930	86058	14·94
65	·1656	·8344	5162	23673	63673	12·33	·1921	·8079	5012	22653	59128	11·80
70	·2675	·7325	4307	18655	40000	9·29	·2976	·7024	4049	17233	36475	9·01
75	·4273	·5727	3155	12405	21345	6·77	·4273	·5727	2844	11183	19242	6·77
80	·6071	·3929	1807	6292	8940	4·95	·6071	·3929	1629	5672	8059	4·95
85	1·0000	—	710	—	2648	3·73	1·0000	—	640		2387	3·73

The $l_{30}-l_x=d_{x-30}$ was obtained from the life table values for females for x=30, 35 etc., and d_0 was equal to zero. The midpoints of the d_{x-30} values were then calculated as follows:

$$\left.\begin{matrix} d_0 \\ d_5 \end{matrix}\right\} \quad d_{2.5}$$
$$\left.\begin{matrix} d_5 \\ d_{10} \end{matrix}\right\} \quad d_{7.5}$$

These corresponded to the life table cumulated of mothers of children aged 0-4, 5-9 etc.

From the δ deaths in an age group of which δ_i deaths were from the cause of interest, i.e. childbirth and tuberculosis, the proportions dead from a particular cause were obtained, $\delta_i/\delta = p_i$. The p_i's were applied to the appropriate d's to obtain the cumulated life table deaths by cause (Table 5.37).

Paternal orphanhood by cause: For fathers the procedure was the same, but it was assumed that they were 35 years older than their children, and $l_{35}-l_x$ was calculated from the male life table (Table 5.38).

Widowhood by cause for male deaths: It was assumed that the wives married on an average at the age of 20 and the husbands at 25. The $l_{25}-l_x$ values were worked out from the male life table to obtain values of d_{x-5}, since wives were assumed to be 5 years younger than their husbands. The midpoints of the d_{x-5}'s were obtained as follows:

$$\left.\begin{matrix} d_{20} \\ d_{25} \end{matrix}\right\} \quad d_{22.5}$$
$$\left.\begin{matrix} d_{25} \\ d_{30} \end{matrix}\right\} \quad d_{27.5}$$

TABLE 5,37

ORPHANHOOD: FEMALE LIFE TABLE DEATHS FROM CHILDBIRTH AND TUBERCULOSIS

x (1)	l_x (2)	$d_{x-30} = l_{30} - l_x$ (3)		Midpoint (4)	Age of Children (5)	Mothers Dead (6)	Deaths Childbirth (7)	Deaths T.B. (8)	Proportion Dead Childbirth (7) ÷ (6) (9)	Proportion Dead T.B. (8) ÷ (6) (10)	Life Table Deaths Childbirth (9) × (4) (11)	Life Table Deaths T.B. (10) × (4) (12)
30	7472	d_0	0									
				$d_{2.5}$	0-4	11	3	—	·2727	—	32	—
35	7236	d_5	236									
				$d_{7.5}$	5-9	43	14	5	·3256	·1163	120	43
40	6972	d_{10}	500									
				$d_{12.5}$	10-14	65	17	6	·2615	·0923	171	60
45	6667	d_{15}	805									
				$d_{17.5}$	15-19	79	18	11	·2278	·1392	208	127
50	6452	d_{20}	1020									
				$d_{22.5}$	20-24	81	14	10	·1728	·1235	201	144
55	6160	d_{25}	1312									
				$d_{27.5}$	25-29	131	13	14	·0992	·1069	150	162
60	5760	d_{30}	1712									
				$d_{32.5}$	30-34	194	14	17	·0722	·0876	151	183
65	5012	d_{35}	2460									
				$d_{37.5}$	35-39	193	13	16	·0674	·0829	198	244
70	4049	d_{40}	3423									
				$d_{42.5}$	40-44	280	14	12	·0500	·0429	201	173
75	2844	d_{45}	4628									
				$d_{47.5}$	45-49	265	16	5	·0604	·0189	316	99
80	1629	d_{50}	5843									
				$d_{52.5}$	50-54	337	10	20	·0297	·0593	188	376
85	640	d_{55}	6832									

TABLE 5.38

ORPHANHOOD: MALE LIFE TABLE DEATHS FROM VIOLENCE AND TUBERCULOSIS

x (1)	l_x (2)	d_{x-35}	$= l_{35} - l_x$ (3)	Midpoint	(4)	Age of Children (5)	Fathers Dead (6)	DEATHS Violence (7)	DEATHS TB (8)	Proportion Dead Violence $(7)\div(6)$ (9)	Proportion Dead T.B. $(8)\div(6)$ (10)	Life Table Deaths Violence $(9)\times(4)$ (11)	Life Table Deaths T.B. $(10)\times(4)$ (12)
35	7011	d_0	0										
				$d_{2.5}$	70	0-4	16	2	4	·1250	·2500	9	18
40	6871	d_5	140										
				$d_{7.5}$	224	5-9	56	6	6	·1071	·1071	24	24
45	6703	d_{10}	308										
				$d_{12.5}$	417	10-14	88	13	8	·1477	·0909	62	38
50	6486	d_{15}	525										
				$d_{17.5}$	672	15-19	131	16	13	·1221	·0992	82	67
55	6193	d_{20}	818										
				$d_{22.5}$	1019	20-24	162	23	13	·1420	·0802	145	82
60	5791	d_{25}	1220										
				$d_{27.5}$	1535	25-29	241	12	12	·0498	·0498	76	76
65	5162	d_{30}	1849										
				$d_{32.5}$	2277	30-34	349	31	22	·0888	·0630	202	143
70	4307	d_{35}	2704										
				$d_{37.5}$	3280	35-39	267	16	10	·0599	·0375	196	123
75	3155	d_{40}	3856										
				$d_{42.5}$	4530	40-44	408	21	13	·0515	·0319	233	145
80	1807	d_{45}	5204										
				$d_{47.5}$	5753	45-49	353	11	15	·0312	·0425	179	245
85	710	d_{50}	6301										

They were then multiplied by the relevant proportions dead by the cause of interest to obtain the life table deaths (Table 5.39).

Widowhood by cause for female deaths: For females the $l_{20}-l_x$ were calculated from the female life table to obtain the d_{x+5}'s. The life table deaths by cause were worked out by the same procedure as for males(Table 5.40).

Results: It was decided to concentrate on the deaths from widowhood by cause, because in the orphanhood method the respondents were entering their mothers and fathers at too late an age, i.e. 35 years for males and 30 years for females. The widowhood deaths, on the other hand, applied to a greater age range because they were entered at 25 years for males and 20 years for females.

The life table deaths from childbirth were weighted for ages of husbands 45-49 to 75-79 and divided by the total number of deaths in the life table for the female ages of 20-45. This gave a figure of 40% of total deaths in the reproductive period due to deaths in childbirth, and was consistent with the evidence from the orphanhood method. The corresponding figure for deaths from tuberculosis to 57.5 years was 17% (Table 5.40).

The weighted estimates for males for deaths from violence for the husbands of women aged 55-75 were divided by the total number of deaths for males in the age range 25-70 years. According to this procedure, 10% of total deaths in the period 25-70 were due to violence. It is highly probable that deaths from violence may have been greater for the under 25's. The deaths from tuberculosis constituted only 7% of the total deaths in that period. This figure was not consistent with the rate observed for females (Table 5.39).

TABLE 5.39

WIDOWHOOD: MALE LIFE TABLE DEATHS FROM VIOLENCE AND TUBERCULOSIS

x (1)	l_x (2)	$d_{x-5} = l_{25} - l_x$ (3)		Midpoint (4)		Age of Wives (5)	Deaths of Husbands (6)	DEATHS VIOLENCE (7)	DEATHS T.B. (8)	Proportion Dead Violence (7) ÷ (6) (9)	Proportion Dead T.B (8) ÷ (6) (10)	Life Table Deaths Violence (9) x (4) (11)	Life Table Deaths T.B. (10) x (4) (12)	Weighting: VIOLENCE (7) x (11) (13)	Weighting: T.B (8) x 12 (14)
25	7381	d_{20}	0												
				$d_{22.5}$	124	20-24	3	1	—	·3333		41			
30	7133	d_{25}	248												
				$d_{27.5}$	309	25-29	2	—	—	—		—			
35	7011	d_{30}	370												
				$d_{32.5}$	440	30-34	9	3	—	·3333		147			
40	6871	d_{35}	510												
				$d_{37.5}$	594	35-39	13	1	—	·0769		46			
45	6703	d_{40}	678												
				$d_{42.5}$	787	40-44	26	5	5	·1923	·1923	151	151		
50	6486	d_{45}	895												
				$d_{47.5}$	1040	45-49	20	2	3	·1000	·1500	104	156		
55	6193	d_{50}	1188												
				$d_{52.5}$	1389	50-54	43	2	4	·0465	·0930	65	129		
60	5791	d_{55}	1590												
				$d_{57.5}$	1905	55-59	25	4	2	·1600	·0800	305	152	1220	304
65	5162	d_{60}	2219												
				$d_{62.5}$	2647	60-64	75	7	6	·0933	·0800	247	212	1729	1272
70	4307	d_{65}	3074					17	12					5239	2679
				$d_{67.5}$	3650	65-69	30	4	1	·1333	·0333	486	122	1944	122
75	3155	d_{70}	4226												
				$d_{72.5}$	4900	70-74	45	2	3	·0444	·0667	218	327	436	981
80	1807	d_{75}	5574												
				$d_{77.5}$	6123	75-79	10	1	1	·1000	·1000	612	612		
85	710	d_{80}	6671												

5239 ÷ 17 = 313 dead from violence for husbands of women 55-75 } T.B = 2679 ÷ 12 = 223
313 dead among 25-70 age group out of 3074 ∴ 10% DEATHS } 223 ÷ 3074 = 7% OF TOTAL DEATHS
... FROM T.B

TABLE 5.40
WIDOWHOOD: FEMALE LIFE TABLE DEATHS FROM CHILDBIRTH AND TUBERCULOSIS

x (1)	l_x (2)	$d_{x+5} = l_{20} - l_x$ (3)		Midpoint (4)		Age of Husband (5)	Deaths of Wives (6)	Deaths Childbirth (7)	T.B (8)	Proportion Dead Childbirth (7)÷(6) (9)	T.B (8)÷(6) (10)	Life Table Deaths Childbirth (9)×(4) (11)	T.B. (10)×(4) (12)	Weighting: Childbirth (7)×(11) (13)	T.B (8)×(12) (14)
20	7757	d_{25}	0												
				$d_{27.5}$	70	25-29	5	3		·6000		42			
25	7618	d_{30}	139												
				$d_{32.5}$	212	30-34	7	4		·5714		121			
30	7472	d_{35}	285												
				$d_{37.5}$	403	35-39	5	–		–					
35	7236	d_{40}	521												
				$d_{42.5}$	653	40-44	19	7	4	·3684	·2105	241	137		
40	6972	d_{45}	785												
				$d_{47.5}$	938	45-49	23	7	2	·3043	·0870	285	82	1995	164
45	6667	d_{50}	1090												
				$d_{52.5}$	1198	50-54	31	5	7	·1613	·2258	193	271	965	1897
50	6452	d_{55}	1305												
				$d_{57.5}$	1451	55-59	17	7	3	·4118	·1765	598	256	4186	768
55	6160	d_{60}	1597												
				$d_{62.5}$	1797	60-64	45	11	2	·2444	·0444	439	80	4829	160
60	5760	d_{65}	1997												
				$d_{67.5}$	2371	65-69	17	3	3	·1765	·1765	418	418	1254	1254
65	5012	d_{70}	2745												
				$d_{72.5}$	3227	70-74	34	6	5	·1765	·1471	570	475	3420	2375
70	4049	d_{75}	3708												
				$d_{77.5}$	4311	75-79	6	1	–	·1667	–	719	–	719	–
								40	22					17368	661
75	2844	d_{80}	4913												
				$d_{82.5}$	5521	80+	51	10		·7143	·0784	4330	433		
80	1629	d_{85}	6128												

CHILDBIRTH: 17368 ÷ 40 = 434 deaths in childbirth period for women of husbands 45-79. Total deaths 20-45 = 1090
434 ÷ 1090 = 40% DEATHS IN CHILDBIRTH

T.B = 6618 ÷ 22 = 301
Total deaths to 57·5 = 1797 ∴ 301 ÷ 1797 = 17%
DEATHS FROM T.B.

C. Comparison of results with other studies

It was considered necessary to compare the results with other studies as an adjunct to the preceding discussion.

The abridged life tables from PGE, for 1962, showed an expectation of life at birth of 50.64 years for males as opposed to 47.13 years for females, a differential of 3.51 years to the advantage of males. This advantage was observed at all ages without exception (PGE, 1968, p. 133). The BRSFM, which was carried out in 1974 and was based on retrospective information, showed corresponding values for males and females of 45.80 years and 46.62 years, an advantage of 0.82 years at birth for females. This advantage was lost in the older ages (BRSFM, 1977, pp. 89-93).

The ratios of the ${}_nq_x$'s from PGE showed that the females started with an advantage at birth which was lost at age 1; at age 5-9 male mortality was higher, but from age group 10-14 to 40-45 , the female disadvantage was consistent and pronounced. In the older ages males experienced higher mortality. The ratios of the ${}_nq_x$'s from the BRSFM showed that the male disadvantage was higher from birth to the age group 25-29, after which the females experienced a more pronounced disadvantage relative to that shown by males in the younger ages (Fig. 24).

The result of 40% of total deaths in the reproductive period due to complications in childbirth was excessively high when compared to the evidence from other countries. The same was true of male deaths from violence (Cf. Preston et al., 1972, s.v. Ceylon and Taiwan).

Ratios (male/female) of ${}_nq_x$'s

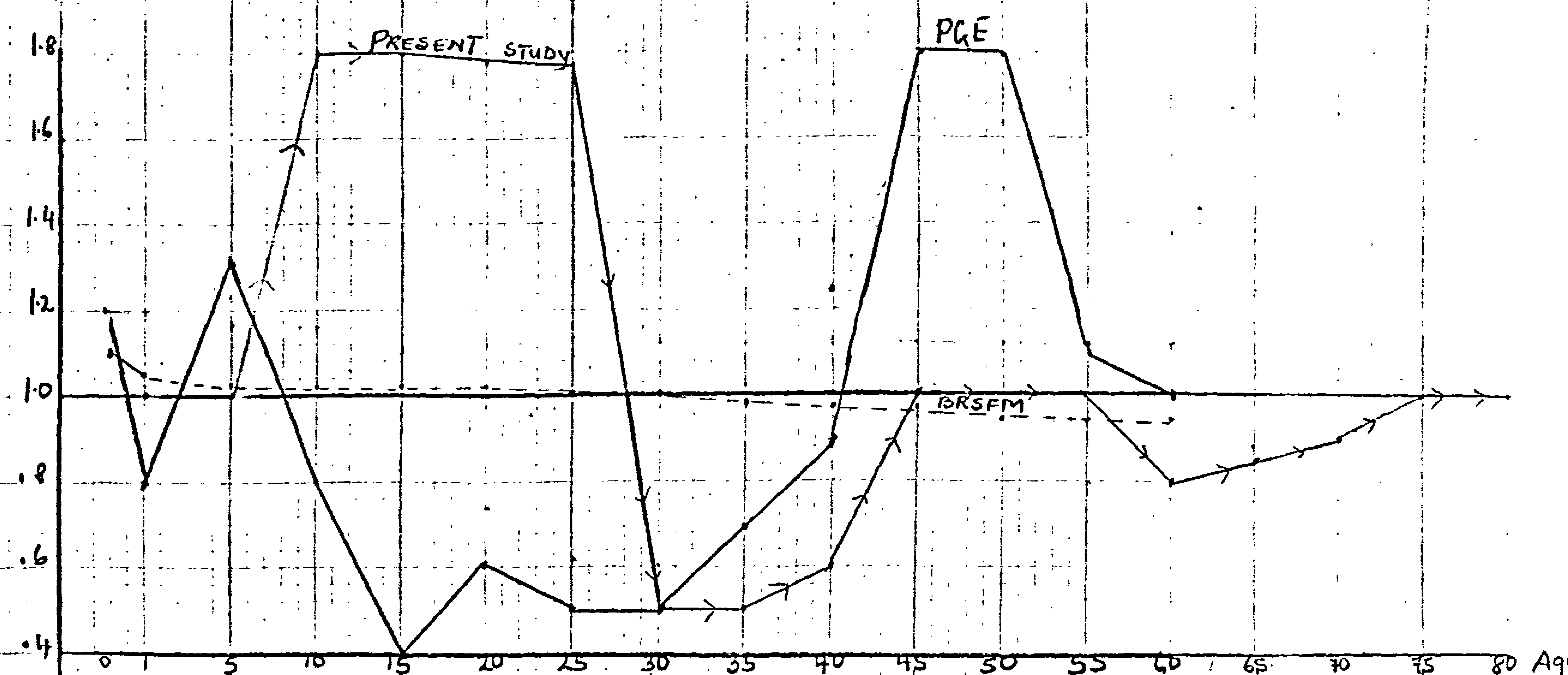


Figure R.4: Ratios (male/female) of probabilities of death (${}_nq_x$) from PGE (1968), BRSFM (1977) and Present study (1979)

5.5.5 The hypothesis considered

The data showed that the mortality of the sexes was the same with an excess of female deaths in the childbearing period and at ages 60-70. The male excess mortality was between ages 10-25. However, it would appear that this was a conservative estimate because of the poorer reporting of female deaths. Therefore, in the light of the evidence examined, it was concluded that there was validity in the hypothesis that there is a sex-differential mortality to the disadvantage of females particularly in the reproductive ages.

5.6 CONCLUSION

The purpose of this chapter was to test the validity of the hypothesis that there are sex-differentials in mortality to the detriment of females. The quality of the data, which served as the basis of the study, was assessed in terms of sex-selective coverage and sex-selective reports of deaths. It had not been possible to carry out a post-enumeration check because of various factors such as a limited budget; therefore it was necessary to rely on broad impressions. The informal checks showed no omission of persons in households. The head of the household, who provided all the information for his family, was hesitant to mention the names of the female members to the male enumerators. This may have resulted in the omission of a few females from the census count, but there is no proof that there was any significant underenumeration of of females. With respect to the indirect evidence, the age distributions showed erratic humps and dips. The striking feature about these distributions was a deficiency of males in the 0-4 age group, and a shortage of females at almost all ages, particularly in the age group 10-14 and in the older ages. These irregularities could be explained by an underenumeration of the population. However, it was suggested that errors of age reporting were a more plausible explanation of these irregularities, which have been observed in other developing countries. In relation to the sex ratio of the total population, the question was whether females were omitted more often than males. The analysis of the sex ratio of the total population showed a sex ratio of 1084, which was lower than that which had been observed by the Government censuses of 1951 and 1961 and the PGE. Furthermore, the marital status data showed that for the currently married, the ratio was close to unity, and the small variation could have arisen due to various factors, i.e. classification and recording. The imbalance in the sex ratios observed in the currently widowed, was mainly caused by the higher male remarriage after widowhood relative to females. The analysis of the sex ratios of those under 30, compared to those over 30, showed that there may have been some underenumeration of females at the younger ages, but the more plausible explanation was that the deficit was partly genuine and partly due to age misreporting.

In connection with the examination of the retrospective mortality data, cultural factors were discussed that might have led to a greater under-reporting of female deaths, especially in infancy and early childhood. However, it was difficult to assess the incidence of bias attributable to any particular factor.

Mortality was estimated separately for each sex by the indirect methods known as the Brass methods. The methods used were based on the use of retrospective questions on infant and childhood mortality, orphanhood status, widowhood status and siblings status. To convert the retrospective information on mortality into life table survivorship probabilities, the necessary population parameters were calculated. These included $\tilde{m}$, the mean age of the fertility schedule for childhood mortality; the mean age of mothers and fathers at the birth of their children; and the mean age at first marriage for males and females. The survivorship probabilities obtained from these sources determined the calculation of α and β. β was calculated by comparison of e_x values derived from orphanhood data with model life tables. The results obtained were below 1.0, but the male and female results compared favourably with each other, i.e. 0.76. β was calculated by the iterative process for the widowhood and siblings survivorship ratios. The β estimates for both males and females, from the widowhood data, were more consistent in the older ages. Therefore, the final estimate was obtained from these ages and was 0.66 for males and females. The male and female values from the siblings data were not consistent, i.e. β was estimated at 0.69 for males and 0.67 for females. From the values of β the α's were calculated, and using the Brass

General standard, the complete and abridged life tables were constructed, for the values of α and β derived from orphanhood, widowhood and siblings data, and also for the average of β from all these sources.

The implications of the values of $\beta < 1.0$ were analyzed. The values of β, which determine the <u>relationship</u> between adult and childhood mortality, showed that adult mortality, both in the case of males and females, was lower relative to infant and early childhood mortality than would have been inferred from the use of a single parameter life table, i.e. with β equal to 1.0 and the same value of α ; and for the older ages of above 51.1 years the mortality was lower than if β were 1.0 with the same value of α.

The sex-differentials in mortality were studied by comparisons of the e_0^o for males and females and the ratios of the $_nq_x$'s (males/females), from the four life tables that had been constructed. In all cases the expectation of life at birth was higher for females than males. The highest difference of 4.4 years was recorded in the life table derived from siblings data. This advantage of females at birth was maintained at all ages. The ratios of the $_nq_x$'s also showed a female advantage at all ages, with a decreasing trend.

The life tables from the standard application of the methods were found inadequate to represent the sex-differentials in the mortality experience of the population. Therefore, the survivorship probabilities derived from the different methods were examined and the relevant sections selected to represent the different age ranges before the construction of the final life table. In the childhood method, broader age groups were used in order to reduce the sample errors of small numbers. The most reliable age group, the under 30's, showed an equal number of proportions dead for the two sexes. In the mortality estimates beyond childhood females survivorship was higher relative to males for the ages 10-30 (childhood and siblings). This could have been the result of male deaths due to violence or the under-reporting of dead sisters. For the reproductive ages 30-45 females were at a disadvantage (widowhood), whereas in the age group 45-60 the mortality of the two sexes was the same (orphanhood and widowhood), after which male survivorship was higher to age 75 (orphanhood). Beyond these ages the data was considered suspect.

The life table was constructed by selecting, for each section of life and sex, model life table probabilities of surviving from the one parameter Carrier and Hobcraft model life tables which best represented the observed values. The sections were then joined to obtain the l_x values. The e_o^o was 52.53 years for males and 52.52 years for females. The sex ratios showed an equality at all ages except 10-25, where males were at a disadvantage, and 30-40 and 60-70, where females recorded a higher mortality.

The deaths by cause were analyzed by both the orphanhood and widowhood method, although the former estimates were abandoned because the deaths were entered for fathers and mothers at too late an age. The latter method showed that 40% of total deaths for females in the ages 20-45 were due to complications in childbirth and 17% up to 57.5 years were due to tuberculosis. For males 7% of the total deaths in the period 25-70 were from tuberculosis and 10% from violence. It was believed that the deaths from violence for the under 20s was probably even higher.

The results were compared to data from the PGE (1968) and the BRSFM (1977). These studies corroborated the findings. The PGE showed a higher e_o^o for males than females. The BRSFM, on the other hand, recorded a slight advantage at birth for females, but this was soon lost at the older ages. The sex ratios of the ${}_nq_x$'s from both the PGE and BRSFM showed a consistent female disadvantage at the reproductive ages. The deaths from complications in childbirth for females and from violence for males were excessively high when compared to the experience of other countries.

It was concluded that the sex-differential estimates of mortality were conservative, because of the probable under-reporting of female deaths, and that there was validity in the hypothesis that there are sex-differentials in mortality to the detriment of females, especially at the reproductive ages.

5.7 METHODOLOGICAL ANNEX

The methodological annex consists of six sections.

5.7.1 Childhood mortality model and tables

The theoretical model: The model underlying the procedure for the estimation of childhood mortality can be described by the following relationship:

$$D_x = \frac{\int_{\alpha}^{x} f(y)\, q_{(x-y)}\, dy}{\int_{\alpha}^{x} f(y)\, dy}$$

where D_x is the proportion of children dead for women aged x at the time of the census; $f_{(y)}$ is the age-specific annual fertility rate at age y; α is the start of the reproductive period; and $q_{(x-y)}$ is the probability of the child dying from birth to age (x-y), because if the child was born when the mother was y years old and at the time of the census she was x years old, the age of the child will be (x-y).

The two functions that determine D_x are the annual age-specific fertility rate for age y, and the cumulative proportion of children dying up to age (x-y) under the specified mortality schedule.

A set of multipliers are used to convert the proportion who have died among the children ever born to women aged x into life table probabilities of dying at exact ages, i.e. $q_{(1)}, q_{(2)}, q_{(5)}$ etc. are estimated from D_1, D_2, D_3 etc. The multipliers were calculated using a standard mortality pattern, the General standard; and a fertility model, the polynomial fertility function in which the location but not the shape could be changed:

$$f_{(y)} = c(y-s)(s+33-y)^2$$

where c is the constant which varies with the level of fertility; s is the age at which fertility begins, its function being to change the location of the distribution relative to the age scale. The shape of the distribution is not altered when s changes, therefore the mean age at childbearing is always equal to s+13.2; the value 33 represents the mean length of the reproductive period.

The multipliers range from very early to very late childbearing. Their choice is determined by four indices of early versus late childbearing: the ratio of the average parity of women 20-24 (P_1/P_2); the ratio of the average parity of women 20-24, to the average parity of women 25-29 (P_2/P_3); the mean age of the fertility schedule($\bar{m}$); the median of the fertility schedule ($\hat{m}$). The first index is a measure of when fertility starts and the rate at which it rises with age, and is therefore a guide to the multipliers needed to convert D_1, D_2 into $q_{(1)}, q_{(2)}$. Recently, it has been shown that the second index(P_2/P_3) is more satisfactory for the estimate of $q_{(2)}$, $q_{(3)}$, $q_{(5)}$, since P_1 is sensitive to both age misreporting and to the fluctuations due to the small number of births in that age group, i.e. the start of childbearing. The other two indices are measures of the age at which childbearing centres and are used for the older ages. (Brass and Coale, 1968, pp. 88-150; Brass

1975, pp. 50-57). J.M. Sullivan proposed a modification to the Brass method which is based on regression equations (1972, pp. 79-97). Both methods give similar results.

The Brass method is based on several assumptions: that fertility and mortality have been constant during the decade preceding the study; that infant and childhood mortality are not highly correlated with the age of the mother; and the omissions or faulty inclusions of reports of lifetime fertility should be equal in both cases. Experience has shown that the method is fairly robust to changes in fertility and declines in mortality. The positive correlation between the mortality of the mother and that of the child would lead to an underestimate of mortality; whereas the omission of dead children seems more common among the older women, so that data for those aged above 40 give unsatisfactory results (Brass, 1975, p. 56; U.N., 1974, p. 230).

Table 5.2 A.

$\bar{m}$, the mean of the Age-Specific Fertility Distribution based on total births in the last year

Age of Women	TOTAL NO of Women	TOTAL Births in last year	ASFR (f) (3) ÷ (2)	Midpoint of age groups (x)	(f) × (x) (4) × (5) =
(1)	(2)	(3)	(4)	(5)	(6)
15-19	564	52	0.0922	17.5	1.6135
20-24	449	103	0.2294	22.5	5.1615
25-29	473	116	0.2452	27.5	6.7430
30-34	439	100	0.2278	32.5	7.4035
35-39	286	64	0.2238	37.5	8.3925
40-44	295	27	0.0915	42.5	3.8888
45-49	230	25	0.1087	47.5	5.1632
TOTAL	2736	487	1.2186		38.3660

$\bar{m}$ of ASFD $= \dfrac{\sum f \times x}{\sum f} = \dfrac{38.3660}{1.2186} = 31.5$ years

$\bar{m} = 31.5 - 0.5 = 31.0$

Table 5.2.B

$\bar{m}$, mean of the Age Specific Fertility Distribution based on Male Births in the last year

Age of Women	Total Women (1)	Total Male Births in last year (2)	ASFR (f) (2) ÷ (1) = (3)	Midpoint of Age Group (x) (4)	ASFR × Midpoint (f) × (x) (5)
15-19	564	27	0.0479	17.5	0.8382
20-24	449	55	0.1225	22.5	2.7562
25-29	473	57	0.1205	27.5	3.3138
30-34	439	55	0.1253	32.5	4.0722
35-39	286	37	0.1294	37.5	4.8525
40-44	295	7	0.0237	42.5	1.0072
45-49	230	9 ①	0.0391	47.5	1.8573
TOTAL	2736	247	0.6084		18.6974

The average of the ASF distribution $= \frac{\Sigma f \times x}{\Sigma f} = 30.7$

① The children born to women beyond 49 years are presumed to be born to women in the age group 45-49. In this case only 4 children.

$\bar{m} = 30.7 - 0.5 = 30.2$

Table 5.2.C

$\bar{m}$ of the ASFD based on Female births in the last year

Total Women (1)	Total Female Births (2)	ASFR (f) (2) ÷ (1) (3)	Midpoint (x) (4)	(f) × (x) (5)
564	25	0.0443	17.5	0.7752
449	48	0.1069	22.5	2.4053
473	59	0.1247	27.5	3.4292
439	45	0.1025	32.5	3.3313
286	27	0.0944	37.5	3.5400
295	20	0.0678	42.5	2.8815
230	16	0.0696	47.5	3.3060
2736	240	0.6102		19.6685

$\bar{m}$ of ASFD $= \frac{\Sigma f \times x}{\Sigma f} = 32.2$

$\bar{m} = 32.2 - 0.5 = 31.7$

Table 5.3.

Calculation of P_i, the average number of children ever born per woman by age group

Age group of Women	Total Women	Total No of children Ever Born		Average No. of Children Born per Woman
(1)	(2)	(3)		(4)
15-19	564	148	(P_1)	0.262
20-24	449	568	(P_2)	1.265
25-29	473	1216	(P_3)	2.571
30-34	439	1975	(P_4)	4.499
35-39	286	1666	(P_5)	5.825
40-44	275	1787		6.058
45-49	230	1636		7.113

$P_2 \div P_3 = 0.492$ TOTAL children

$P_2 \div P_3 = 0.4629$ Male children only

$P_2 \div P_3 = 0.5298$ Female children only.

5.7.2 Orphanhood model and tables

The theoretical model: The procedure for the estimation of adult mortality from orphanhood is given in terms of maternal orphanhood, with the relevant modifications underlined for paternal orphanhood. The relationship is:

$$P_x = \frac{\int_{\alpha}^{\beta} e^{-ry} f(y) \; l_{x+y} \, dy}{\int_{\alpha}^{\beta} e^{-ry} f(y) \; l_y \, dy}$$

where P_x is the proportion of children of exact age x whose mothers were alive at the time of the study; r is the rate of growth of the stable population; e, a constant, is 2.7183 in the expression e^{-ry} used for the stable population age distribution, given as $A(y) = c \, e^{-ry} \, l_y$; f(y) is the age-specific annual fertility rate at age y or the probability of having a birth at age y; l_{x+y}/l_y is the probability of surviving from age y to x+y; α and β are the reproductive ages, i.e. the earliest and latest ages at which childbearing could have occurred.

As in the case of childhood mortality, a fixed mortality schedule, the General Standard; and a fertility model, the polynomial function model, were used to calculate the conversion factors.

In the first method, the proportions not orphaned in the age group, centred on the age N, the midpoint of the age group, are converted by the use of multiplying factors into life table probabilities of surviving, from a base age B to B+N, according to the equation:

$$\frac{l_{B+N}}{l_B} = k_N P_N$$

The k factors were calculated for $\bar{M}$, which is approximate to the interval from birth to the mid-point of the age group to which P_x refers, for a variety of age locations of the fertility function, i.e. $\bar{M}$ =22, 23 etc, from four base ages for females and six for males. ... It is important to keep the multiplying factors as close to unity as possible. Therefore, if the assumptions underlying the derivation are not applicable to the circumstances in which the model is used, then the error is minimal.

The model for paternal orphanhood is similar with two alterations. The first is in the fertility function which is:

$$f(y)=c(y-s)(s+60-y)^3$$

where s is the age at which fatherhood starts; c is the constant which varies with fertility, and the second bracket of the equation is cubed. The function describes a less symmetrical curve than that used for females, and is spread over 60 fertile years. It is used in a similar way to the female function so that variations in fertility are simulated by changing the age location , but not altering the shape.

The second modification was in the parameter N, which became N+2.5, a convenient figure which takes the interval to the end of each age group and allows for the gestation period, i.e. mothers can only die during or after childbirth, but fathers can die any time after conception.

The second method is similar to the previous one, but it eliminates the use of several base ages. The estimating equation is:

$$\frac{l_{B+N}}{l_B} = W(N)\ {}_5P_{N-5} + (1-W(N))\,{}_5P_N$$

where N is the mid-point of two adjacent age groups; ${}_5P_{N-5}$ and ${}_5P_N$ are proportions not orphaned in the two adjoining age groups; and W(N) are the weights.

The relevant set of weights are selected for a particular application on the basis of $\bar{M}$, the mean age at childbearing. The base age is fixed at 25 for females and 32.5 and 37.5 for males. The equation for males is:

$$\frac{l_{B+N+2.5}}{l_B} = W(N)\ {}_5P_{N-5} + (1-W(N))\,{}_5P_N$$

The assumptions on which the procedure is based are, that the patterns of mortality and fertility approximate those of the models used for the conversion factors; that fertility and mortality have been constant for an indefinite period before the study; and that the mortality of the parent is independent of the number of offspring living in the population. The method has proved to be robust with regard to the first assumption; whereas in the case of falling mortality the bias is considered to be minor; and it is not known what magnitude of bias would exist, if there is a correlation between the number of living children and the mortality of parents. The maternal orphanhood method id considered more robust than paternal orphanhood. The latter is sensitive to the shape of the distribution of births by father's age, which is influenced by fertility at the older ages (Brass, 1975, p. 75 and p. 80; U.N., 1974, p. 231).

Table 5.6.

Calculation of $\bar{M}$, the mean age of mothers, from data on births during 12 months preceding the census

Age of Women	Male Child Alive (1)	Male Child Dead (2)	Female Child Alive (3)	Female Child Dead (4)	Total (f) (5)=(1)+(2)+(3)+(4)	Midpoint of Age group (x) (6)	(f)×(x) (7)
10-14	–	–	1	–	1	12.5	12.5
15-19	24	3	22	2	51	17.5	892.5
20-24	51	4	46	2	103	22.5	2317.5
25-29	55	2	52	7	116	27.5	3190.0
30-34	49	6	37	8	100	32.5	3250.0
35-39	35	2	25	2	64	37.5	2400.0
40-44	6	1	20	–	27	42.5	1147.5
45-49	4	1	9	–	14	47.5	665.0
50-54	2	1	6	–	9	52.5	472.5
55-59	1	–	1	–	2	57.5	115.0
TOTAL	227	20	219	21	487		14462.5

$$\frac{\Sigma fx}{\Sigma f} = \frac{14462.5}{487} = 29.7 \qquad \bar{M} = 29.7 - 0.5 = 29.2 \left\{\text{As births have occurred, on an average, half a year earlier}\right\}$$

TABLE 5.9.A.

MEAN AGE OF MEN WHOSE WIVES HAVE GIVEN BIRTH IN THE LAST YEAR. (HAND TABULATED)

Midpoint (x)	FATHERS (f)	(f)x(x)
12·5	—	—
17·5	4	70·0
22·5	50	1125·0
27·5	116	3190·0
32·5	85	2762·5
37·5	71	2662·5
42·5	75	3187·5
47·5	37	1757·5
52·5	28	1470·0
57·5	5	287·5
62·5	16	1000·0
TOTAL	487	17512·5

$$\bar{x} = \frac{17512 \cdot 5}{487} = 35 \cdot 95$$

NOTE ON DATA:

DAUGHTERS: 245 births where ages of mother known + tabulated, but ages of only 244 fathers known.

SONS: 244 births; 241 ages of both parents known; (1) where age of mother is known only; and (2) where only age of father known

TABLE 5.9.B

MEAN AGE OF WOMEN WHO HAVE GIVEN BIRTH IN LAST YEAR (HAND TABULATED)

Midpoint (x)	MOTHERS (HANDS) (f)	MOTHERS COMPUTER (f)*	(f)x(x)
12·5	2	1	25·0
17·5	47	51	822·5
22·5	100	103	2250·0
27·5	120	116	3300·0
32·5	107	100	3477·5
37·5	62	64	2325·0
42·5	29	27	1232·5
47·5	13	14	617·5
52·5	6	9	315·0
57·5	1	2	57·5
62·5	–	–	–
TOTAL	487	487	14422·5

$$\bar{x}' = \frac{14422 \cdot 5}{487} = 29 \cdot 6$$

NOTE: COMPARE MEAN AGE OF WOMEN TO TABLE 5·6, COMPUTER DATA.

TABLE 5.10.A

CALCULATION OF THE MEAN AGE AT MARRIAGE FOR CURRENTLY MARRIED PERSONS ONLY:

Age Group	MALES Midpoint (x)	MALES (f)	(f) x (x)	FEMALES (f')	(f') x (x)
10-14	12.5	1	12.5	7	87.5
15-19	17.5	32	560.0	194	3395.0
20-24	22.5	157	3532.5	350	7875.0
25-29	27.5	376	10340.0	429	11797.5
30-34	32.5	364	11830.0	419	13617.5
35-39	37.5	244	9150.0	266	9975.0
40-44	42.5	304	12920.0	266	11305.0
45-49	47.5	213	10117.5	209	9927.5
50-54	52.5	253	13282.5	172	9030.0
55-59	57.5	111	6382.5	95	5462.5
60-64	62.5	179	11187.5	105	6562.5
65-69	67.5	69	4657.5	45	3037.5
70-74	72.5	100	7250.0	30	2175.0
75-79	77.5	17	1317.5	9	697.5
80-84	82.5	54	4455.0	12	990.0
85+	87.5 (ad-hoc)	28	2450.0	2	175.0
TOTAL		2502	109445.0	2610	96110.0

Arithmetic Mean (Average) $= \bar{x} = \dfrac{\Sigma fx}{\Sigma f} = \dfrac{109445.0}{2502} = 43.74$

$\bar{x}' = \dfrac{96110.0}{2610} = 36.82$

$\bar{x} - \bar{x}' = 43.74 - 36.82 = 6.92$ years

Table 5.10.B

Mean Age at Marriage for PERSONS EVER MARRIED (ONCE + MORE THAN ONCE), By SEX

Midpoint	MALES		FEMALES	
(x)	(f)	(f) x (x)	(f')	(f') x (x)
2.5	–	–	–	–
7.5	–	–	–	–
12.5	1	12.5	7	87.5
17.5	35	612.5	195	3412.5
22.5	158	3555.0	354	7965.0
27.5	376	10340.0	434	11935.0
32.5	366	11895.0	426	13845.0
37.5	245	9187.5	276	10350.0
42.5	307	13047.5	288	12240.0
47.5	219	10402.5	225	10687.5
52.5	259	13597.5	213	11182.5
57.5	115	6612.5	118	6785.0
62.5	196	12250.0	181	11312.5
67.5	75	5062.5	75	5062.5
72.5	114	8265.0	82	5945.0
77.5	20	1550.0	20	1550.0
82.5	70	5775.0	61	5032.5
87.5	37	3237.5	13	1137.5
TOTAL	2593	115402.5	2968	118530.0

$\bar{x} = \frac{115402.5}{2593} = 44.50 \quad \bar{x}' = \frac{118530.0}{2968} = 39.94$

$\bar{x} - \bar{x}' = 44.50 - 39.94 = 4.56.$

TABLE 5.10.C

Mean Age AT FIRST MARRIAGE (AGE-YEARS OF MARRIAGE) FOR THOSE MARRIED ONCE ONLY By SEX.

Age group	Midpoint (x)	MALES (f)	(f) x (x)	FEMALES (f')	(f') x (x)
0-4	2.5	2	5.0	11	27.5
5-9	7.5	3	22.5	40	300.0
10-14	12.5	46	575.0	358	4475.0
15-19	17.5	388	6790.0	1449	25357.5
20-24	22.5	898	20205.0	768	17280.0
25-29	27.5	595	16362.5	198	5445.0
30-34	32.5	222	7215.0	70	2275.0
35-39	37.5	83	3112.5	21	787.5
40-44	42.5	42	1785.0	13	552.5
45-49	47.5	14	665.0	2	95.0
50-54	52.5	9	472.5	3	157.5
55-59	57.5	4	230.0	1	57.5
60-64	62.5	4	250.0	2	125.0
TOTAL		2310	57690.0	2936	56935.0

$\bar{x} = \frac{57690}{2310} = 24.97$ $\bar{x}' = \frac{56935}{2936} = 19.39$

$\bar{x} - \bar{x}' = 24.97 - 19.39 = 5.58$ years

TABLE 5.10.D

Mean Age AT FIRST MARRIAGE (AGE-YEARS OF MARRIAGE FOR THOSE MARRIED ONCE + CURRENTLY MARRIED By Sex.

Age group	Midpoint (x)	MALES (f)	(f) x (x)	FEMALES (f')	(f') x (x)
0-4	2.5	2	5.0	7	17.5
5-9	7.5	3	22.5	39	292.5
10-14	12.5	45	562.5	342	4275.0
15-19	17.5	378	6615.0	1321	23117.5
20-24	22.5	860	19350.0	619	13927.5
25-29	27.5	577	15867.5	170	4675.0
30-34	32.5	212	6890.0	51	1657.5
35-39	37.5	82	3075.0	18	675.0
40-44	42.5	41	1742.5	9	382.5
45-49	47.5	14	665.0	2	95.0
50-54	52.5	8	420.0	2	105.0
55-59	57.5	4	230.0	1	57.5
60-64	62.5	4	250.0	—	
		2230	55695.0	2581	49277.5

$\bar{x} = \frac{55695}{2230} = 24.97$ $\bar{x}' = \frac{49277.5}{2581} = 19.09$

$\bar{x} - \bar{x}' = 24.97 - 19.09 = 5.88$ years.

TABLE 5.10.E

Mean Age at first marriage (Age-yrs of Marriage)
FOR THOSE EVER MARRIED

Midpoint	Males		Females	
(x)	(f)	(f) x (x)	(f')	(f') x (x)
2.5	2	5.0	11	27.5
7.5	3	22.5	40	300.0
12.5	48	600.0	360	4500.0
17.5	416	7280	1457	25497.5
22.5	970	21825.0	774	17415.0
27.5	657	18067.5	206	5665.0
32.9	256	8320.0	73	2372.5
37.5	105	3937.5	24	900.0
42.5	69	2932.5	14	595.0
47.5	22	1045.0	3	142.5
52.5	19	997.5	3	157.5
57.5	10	575.0	1	57.5
62.5	16	1000.0	2	125.0
TOTAL	2593	666070.5	2968	57755.0

$\bar{x} = \frac{66607.5}{2593} = 25.69$ $\bar{x}' = \frac{57755.0}{2968} = 19.46$

$\bar{x} - \bar{x}' = 25.69 - 19.46 = 6.23$ years

5.7.3 The widowhood model and tables

The theoretical model: The procedure for the estimation of adult mortality from widowhood is described in terms of male mortality, i.e. widowhood information from female respondents, with the relevant differences underlined for female mortality. The relationship is:

$$P_{x+b} = \frac{\int_{\alpha}^{\beta} e^{-ry}\ f(y)\ l_{x+y}\ dy}{\int_{\alpha}^{\beta} e^{-ry}\ f(y)\ l_{y}\ dy}$$

where P_{x+b} is the proportion of women aged x+b years, not widowed, i.e. proportion of women aged x+b , with first husband alive, after x years of marriage and who had contracted their first marriage at exact age b; r in the expression e^{-ry} shows the rate of growth of the stable population; f(y) is the distribution by age of males marrying single women; α and β are the earliest and latest ages at which marriages occur; l_{y+x}/l_y is the probability of surviving from age y to x+y.

The female first marriage distribution is represented by the function:

$$f(y)=y^{\frac{1}{3}}\ (30-y)^4$$

and the male first marriage distribution by:

$$f(y)=y^{\frac{1}{2}}(30-y)^3$$

Both functions have the same range of 30 years. The mean of the female function is 6.3 years, with 90% married after 12.8 years; the mean of the male function is 8.3 years with 90% married after 15.5 years. For mortality, the Brass General standard was used with l_2 of 800 and a rate of population growth of 2%.

The estimating equation to relate proportions not widowed to survivorship probabilities, for male adult mortality, when the mean age at first marriage for female respondents is below 20, is:

$$\frac{l_{N+5}}{l_{22.5}} = W(N)_5P_{N-5} + (1-W(N))_5P_N$$

where N is the central age of the two adjacent age groups; P is the proportion not widowed in the age group. Where the mean age at female marriage is above 20, the base age is l_{27}.

For female adult mortality, when the mean age at male marriage is below 25, the estimating equation is:

$$\frac{l_{N-5}}{l_{17.5}} = W(N)\ _5P_{N-5} + (1-W(N))_5P_N$$

where N is the central age of two male age groups; P is the proportion of men who are not widowed. If the mean age at male marriage is between 25 and 30, the base age is $l_{22.5}$.

The widowhood method is based on the assumption that all respondents marry first at the mean age of first marriage. The bias introduced by this assumption was investigated and it was found that the method was robust to variations in marriage patterns, and a serious bias is only introduced in the case of young respondents, where first marriages are still occurring in significant numbers, i.e. the exposure to risk is biased downwards with the result of underestimating widowhood (Hill, 1977, pp. 75-84).

Table 5.13

Calculation of Male Population Weighted Mean Age at First Marriage

Age group	Ever Married	Never Married	Total (2)+(3)	Proportion Single (3) ÷ (4)	Rate	New Age Group	Adjusted Population	Marriages (6) x (8)	Central Age of col (7)	Marriages x Central Age (9) x (10)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
10-14	1	1000	1001	0.999	0.001	10.0 – 12.5	542	0.5	11.25	5.625
15-19	35	606	641	0.945	0.054	12.5 – 17.5	812	43.8	15.00	657.000
20-24	158	317	475	0.667	0.278	17.5 – 22.5	532	147.9	20.00	2958.000
25-29	376	158	534	0.296	0.371	22.5 – 27.5	501	185.9	25.00	4647.500
30-34	366	59	425	0.139	0.157	27.5 – 32.5	494	77.6	30.00	2328.000
35-39	245	12	257	0.047	0.092	32.5 – 37.5	330	30.4	35.00	1064.000
40-44	307	11	318	0.035	0.012	37.5 – 42.5	283	3.4	40.00	136.000
45-49	219	2	221	0.009	0.026	42.5 – 47.5	271	7.0	45.00	315.000
50-54	259	3	262					$\Sigma = 496.5$		Σ 12111.125
55-59	115	2	117							

$$\text{Mean} = \frac{\Sigma(11)}{\Sigma(10)} = \frac{12111.125}{496.5} = 24.39$$

Col (6) = First rate is calculated by (1.000 − 0.999), and the later age groups are the differences of two consecutive proportion single in col (5) i.e. (.999 − .945); (.945 − .667) etc.

Col (7) = New age groups (Vol 31, No. 1. Pop Studies, Table 6, p. 82). They are the mid-point of the preceding age group to midpoint of the age group.

Col (8) = See Table 5.14.A Calculation for working out Adjusted Population from col (4).

Col (10) = Midpoints of the new adjusted age groups.

Table 5.14.A

Calculation for Working out Adjusted Population corresponding to New Age groups in Table 5.13, Col(7).

	Coefficients corresponding to x = 0.50 and Middle Age groups		
	A = 0.625 Youngest Ages	B = 0.5000 Middle Age groups	C = —.0625 Oldest Age group
For	A	B	C
10-12.5	·0625 x 1301 +	·5000 x 1001 +	(-·0625) x 641 = 542
15-17.5	·0625 x 1001 +	·5000 x 641 +	(-·0625) x 475 = 353
20-22.5	·0625 x 641 +	·5000 x 475 +	(-·0625) x 534 = 244
25-27.5	·0625 x 475 +	·5000 x 534 +	(-·0625) x 425 = 270
30-32.5	·0625 x 534 +	·5000 x 425 +	(-·0625) x 257 = 230
35-37.5	·0625 x 425 +	·5000 x 257 +	(-·0625) x 318 = 135
40-42.5	·0625 x 257 +	·5000 x 318 +	(-·0625) x 221 = 161
45-47.5	·0625 x 318 +	·5000 x 221 +	(-·0625) x 262 = 114

① Total Males in 5-9 (1301) and 50-54 (262) were used as this data was available. In order to facilitate calculations by using same coefficients corresponding to $x = 0.50$ even for the age group (10-14) and (45-49) to make them the middle Age groups (Hobcrafts Table D, p 204)

② We have to estimate the pop. values from beginning to mid of each age interval ∴ (10-12.5) in age interval (10-14) =

$$\frac{12.5-10}{5} = \frac{2.5}{5} = 0.5 = x$$

③ Multiply A by pop. in preceding age interval pop.
Multiply B by pop. in middle age interval pop
Multiply C by pop in succeeding age interval pop.

④ For last col. see calculations in Table 5.14.B.

Table 5.14.B

Calculation for Working out Adjusted Population for col(8), Table 5.13

Age	Pop.	Age	Adjusted Population for col(8) Table 5.13
10-12.5	542	10-12.5	- - - - 542
15-17.5	353	12.5-17.5 = (15-17.5) + {12.5 to 15 = (10-15)-(10-12.5)} = 353+(1001-542) = 812.	
20-22.5	244	17.5-22.5 = (20-22.5) + {17.5 to 20 = (15-19)-(15-17.5)} = 244+(641-353) = 532	
25-27.5	270	22.5-27.5 = (25-27.5) + {22.5 to 25 = (20-24)-(20-22.5)} = 270+(475-244) = 501	
30-32.5	230	27.5-32.5 = (30-32.5) + {27.5 to 30 = (25-29)-(25-27.5)} = 230+(534-270) = 494	
35-37.5	135	32.5-37.5 = (35-37.5) + {32.5 to 35 = (30-34)-(30-32.5)} = 135+(425-230) = 330	
40-42.5	161	37.5-42.5 = (40-42.5) + {37.5 to 40 = (35-39)-(35-37.5)} = 161+(257-135) = 283	
45-47.5	114	42.5-47.5 = (45-47.5) + {42.5 to 45 = (40-45)-(40-42.5)} 114+(318-161) = 271	

Note:
For Calculation of 12.5-17.5
For 10-12.5 we have calculated 542. (12.5-15) = Pop(10-14) - Pop(10-12.5) = (1001-542) = 459
15-17.5 = 353; 12.5-15 = 459 ∴ 12-17.5 = 353+459 = 812.

TABLE 5.14.C*

Calculation of Female Population Weighted Mean Age at First Marriage

Age	Ever Married	Never Married	Total	Proportion Single	Rate	New Age Group	Adjusted Population	Marriages	Central Age	Marriages x Midpoint
			(2)+(3)	(3)÷(4)				(6) x (8)		(9) x (10)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
10-19	202	1140	1342	0.849	·151	10.0–15.0	737	111.29	12.50	1391.12
20-29	788	134	922	0.145	·704	15.0–25.0	1105	777.92	20.00	15558.40
30-39	702	23	725	0.032	·113	25.0–35.0	809	91.42	30.00	2742.60
40-49	513	12	525	0.023	·009	35.0–45.0	626	5.63	40.00	225.20
50-59	331	9	340	0.026 *				986.26		19917.32

$$\frac{19917.32}{986.26} = 20.19 \text{ years}$$

* Note: The proportion single (·026) in the age group 50-59 is higher than in the age group 40-49 (·023), therefore it is not used in the calculations. Even if it is assumed that the proportion single in the age group 50-59 is equal to the value of the previous class interval (·023), the rate would be = 0.00 for the age group 50-59 and as a result Marriages would be 0.00 and Marriages x Midpoints because when the Adjusted population for 45-55 when multiplied by Rate = 0 would be 0.

Singulate Mean Age at Female Marriage
Hajnal Method

Age	Female Ever Married	Female Never Married	Total (2) + (3)	Proportion single (%) (3) ÷ (4)
(1)	(2)	(3)	(4)	(5)
0-4	–	1285	1285	100.00
5-9	–	1167	1167	100.00
10-14	7	771	778	99.10
15-19	195	369	564	65.43
20-24	354	95	449	21.16
25-29	434	39	473	8.25
30-34	426	13	439	2.96
35-39	276	10	286	3.50
40-44	288	7	295	2.37 Σ=402.77
45-49	225	5	230	2.17

Singulate Mean Age at Marriage = 19.56 years

1. The cut-off age was 45.
2. % single added up to age group 40-44 and multiplied by 5, the age-group interval (402.77×5). This gave the number of total single years, for a cohort of 100 girls from birth, of 2013.85.
3. The number who remain single till 45 i.e. who do not marry at all is the average of the % single in the two adjacent age groups containing 45 i.e. 40 to 44 and 45-49. Therefore the number who remain single = 2.37 + 2.17 ÷ 2 = 2.27; and the number of years lived by them = 2.25 × 45 = 102.15.
4. Those who marry by exact age 45 = 100 − 2.27 = 97.73.
5. The number of unmarried years by those who married by 45 = 2013.85 − 102.15 = 1911.15
6. The average number of unmarried years by those who married by 45 = 1911.15 ÷ 97.73 = 19.56 years

TABLE 5.15.A

Singulate Mean Age at Male Marriage

Hajnal Method

Age	Males Ever Married	Males Never Married	Total (2)+(3)	Proportion Single (%) (3) ÷ (4)
(1)	(2)	(3)	(4)	(5)
0-4	–	1242	1242	100.0
5-9	–	1301	1301	100.0
10-14	1	1000	1001	99.9
15-19	35	606	641	94.5
20-24	158	317	475	66.7
25-29	376	158	534	29.6
30-34	366	59	425	13.9
35-39	245	12	257	4.7 Σ 509.3
40-44	307	11	318	3.5

1. The cut-off age was 40
2. The % single were added up to age group 35-39 and multiplied by 5 (509.3 x 5). This gave the number of total single years, for a cohort of 100 boys at birth, of 2546.5.
3. The number who remain single = 4.7 + 3.5 = 8.2 ÷ 2 = 4.1. The number of years lived by them = 4.1 x 40 = 164.0
4. Those who marry by exact age 40 = 100 – 4.1 = 95.9
5. The number of unmarried years by those who married by 40 = 2546.5 – 164.0 = 2382.5
6. The average number of unmarried years by those who married by 40
2382.5 ÷ 95.9 = 24.8

Table 5.16.B

Calculation of Weights for male mean age 24.4 and female mean age 18 years by Interpolation

Male Mean Age	($l_{N+5}/l_{22.5}$) Mean Age at female marriage : 18 years Central Age of Women									
	20	25	30	35	40	45	50	55	60	65
24	.5830	.4344	.5006	.5731	.6447	.7015	.7303	.7504	.7154	.6696
25	.5945	.4563	.5404	.6349	.7294	.8079	.8568	.8944	.8767	.8462
24.4	.5876	.4432	.5165	.5978	.6786	.7440	.7809	.8080	.7799	.7402

Source : K. Hill, 1977, Table 1, p. 79

Table 5.16.C

Calculation of Correction Factor by Interpolation for Female Mean Age at first Marriage.

Mean Age at First Marriage	Correction Factor
19	−0.20000 = −.2
20	−0.40000 = −.4
19.56	−0.3120 = −.3

Source : *Ibid*, Table 2, p. 79.

Table 5.16.D

Calculation of Adjusted Weights for mean age at Female Marriage : 19.56 and Male Mean Age at Marriage 24.4 years

	Mean Age at Female Marriage : 19.56. ($l_{N+5}/l_{22.5}$) Central Age of Women									
	20	25	30	35	40	45	50	55	60	65
Male Mean Age = 24.4	+.5876	+.4432	+.5165	+.5978	+.6786	+.7440	+.7809	+.8080	+.7799	+.7402
Correction = −.3120	−.3120	−.3120	−.3120	−.3120	−.3120	−.3120	−.3120	−.3120	−.3120	−.3120
Adjusted W_N	.2756	.1312	.2045	.2858	.3166	.4320	.4689	.4960	.4679	.4282

TABLE 5.17.B

Calculation of Weights for Mean Age at Male Marriage: 23
Female Mean 20.19

Female Mean	$l_{N-5}/l_{17.5}$ MEAN AGE AT MALE MARRIAGE CENTRAL AGE OF MEN								
	25	30	35	40	45	50	55	60	65
20	.6100	.4191	.4566	.5310	.6161	.7028	.7757	.8211	.8568
21	.6357	.4546	.5041	.5943	.6980	.8034	.8939	.9563	1.0070
20.19	.6149	.4258	.4656	.5430	.6317	.7219	.7982	.8468	.8853

Source: Hill, 1977, Table 3, p. 81

TABLE 5.17.C

Calculation of Correction Factor for Male mean age at first marriage

Mean Age at Marriage	Correction	
24	−0.2000 =	−0.2
25	−0.4000 =	−0.4
24.8	−0.3600 =	−0.3

Source: Ibid., Table 4, p. 81.

TABLE 5.17.D

Calculation of Adjusted Weights for Mean Age at Male Marriage: 24.8 years and Female Mean Age at Marriage of 20.19 years

	Mean Age at Male Marriage: 24.8 ($l_{N-5}/l_{17.5}$) Central Age of Men								
	25	30	35	40	45	50	55	60	65
Female Mean 20.19	.6149	.4258	.4656	.5430	.6317	.7219	.7982	.8468	.8853
Correction	−.3600	−.3600	−.3600	−.2600	−.3600	−.3600	−.3600	−.3600	−.3600
Adjusted W_N	.2549	.0658	.1056	.1830	.2717	.3619	.4382	.4868	.5253

5.7.4 Siblings model

The theoretical model: The respondents aged a years at the time of the survey were born a years ago from the date of the survey. Their mothers were b years old at the time of their births. Therefore the ages of the mother at the time of the survey would be (a+b) years. The age-specific fertility distribution is represented by f(x); where x denotes the age of the women, x will vary from 0 to (a+b). Theoretically f(x)=0 for ages below and above the age period of reproduction.

According to the stable population, women aged (x) years old at the time of the survey would be:

$$(1) \qquad A(x)=K\ e^{-rx}\ l_x$$

where r is the rate of growth of the stable population.

The mothers of the respondents aged a are (a+b) years, therefore the total number of women aged (a+b) including the mothers would be:

$$A(a+b)=K\ e^{-r(a+b)}\ \hat{l}_{(a+b)}$$

From the total number of women aged (a+b), including the respondents' mothers aged $(\overline{a+b})$, the number of women who gave birth when they were b years old is equal to the births a years ago:

$$(2) \qquad K\ e^{-r(a+b)}\ \hat{l}_{(a+b)}\ f(b)$$

$\hat{l}_{(a+b)}$ is the mortality of the mothers, whose population structure is assumed to be stable. From the birth cohort a years ago, those surviving to the time of the survey, i.e. those who are a years at the time of the survey, and are the respondents who gave information about their siblings, would be:

(3) $$K\, e^{-r(a+b)}\, \hat{l}_{(a+b)}\, f(b)\, \overset{*}{l}_a$$

where $\overset{*}{l}_a$ represents the mortality of the children. In other words, $\hat{l}$ represents the l of the life table or the mortality of the mothers, and $\overset{*}{l}$ the mortality of the siblings.

The assumptions are: (i) that there were no multiple births, therefore to each respondent or child there corresponds one mother; (ii) that no births occur for one year on either side of b to the mothers of the respondents aged a, i.e. f(x)=0 for the age intervals (b-1) to b and b to (b+1); the birth, that is to say the birth of the respondent, occurs exactly at age 'b'. (iii) that f(x) is ½ of its value for those mothers in ages (b-2) to (b-1) and (b+1) to (b+2).

The respondents aged 'a' at the time of the survey expressed in equation (3), had their mothers, equal to them in number, alive when the mothers were b years old or earlier. It is only after age b, i.e. after they had given birth, mortality had its effect. Therefore some of the mothers would have died in the interval between the births of the respondent and the time of the survey, i.e. from ages b to (a+b). So in order to calculate the number of births given by <u>these mothers</u>, who constitute the siblings of the respondents, the factor of continuous decrease in the number of these mothers after age b, due to mortality, has to be taken into account. Prior to age b, their number is the same as given by (3) as they were alive at age 'b' and equal to that at age b.

(4) Births during 0 to (b-2) $= \int_0^{b-2} K\, e^{-r(a+b)}\, \hat{l}_{(a+b)}\, f(b)\, \overset{*}{l}_a\, f(x)\, dx$

(5) Births during (b-2) to (b-1) with $\frac{1}{2}$ f(x) $= \frac{1}{2}\int_{b-2}^{b-1} K\, e^{-r(a+b)}\, \hat{l}_{(a+b)}\, f(b)\, \overset{*}{l}_a\, f(x)\, dx$

(6) Births during (b+1) to (b+2) with $\frac{1}{2}$ f(x) $= \frac{1}{2}\int_{b+1}^{b+2} K\, e^{-r(a+b)}\, \hat{l}_{(a+b)}\, f(b)\, \overset{*}{l}_a\, \frac{\hat{l}_x}{\hat{l}_b}\, f(x) dx$

where $\hat{l}_x/\hat{l}_b$ is the survivorship factor for mothers from age b to x.

(7) Births during (b+2) to (a+b) $= \int_{b+2}^{a+b} K\, e^{-r(a+b)}\, \hat{l}_{(a+b)}\, f(b)\, \overset{*}{l}\, \frac{\hat{l}_x}{\hat{l}_b}\, f(x)\, dx$

Therefore the total number of births to the mothers aged 'b' at the birth of the respondents aged 'a', at the time of the survey, other than the respondents themselves, i.e. the siblings of the respondents, are the sum of (4), (5), (6) and (7):

$$S_{(a,b)} = \int_0^{b-2} K\, e^{-r(a+b)}\, \hat{l}_{(a+b)}\, f(b)\, \overset{*}{l}_a\, f(x)\, dx$$

$$+\frac{1}{2}\int_{b-2}^{b-1} K\, e^{-r(a+b)}\, \hat{l}_{(a+b)}\, f(b)\, \overset{*}{l}_a\, f(x)\, dx$$

$$+\frac{1}{2}\int_{b+1}^{b+2} K\, e^{-r(a+b)}\, \hat{l}_{(a+b)}\, f(b)\, \overset{*}{l}_a\, f(x)\, dx$$

$$+\frac{1}{2}\int_{b+2}^{a+b} K\, e^{-r(a+b)}\, \hat{l}_{(a+b)}\, f(b)\, \overset{*}{l}_a\, \frac{\hat{l}_x}{\hat{l}_b}\, f(x)\, dx$$

$$= (8) \qquad S_{(a,b)} = K\, e^{-r(a+b)}\, \hat{l}_{(a+b)}\, f(b)\, \overset{*}{l}_{(a)} \left\{ \int_0^{b-2} f(x)\, d_x + \tfrac{1}{2}\int_{b-2}^{b-1} f(x)\, dx + \tfrac{1}{2}\int_{b+1}^{b+2} f(x)\, \frac{\hat{l}_x}{l_b}\, dx + \tfrac{1}{2}\int_{b+2}^{a+b} f(x)\, \frac{\hat{l}_x}{l_b}\, dx \right\}$$

If the survivorship factor is taken into account the equation becomes:

$$(9) \qquad \overset{*}{S}_{(a,b)} = K\, e^{-r(a+b)}\, \hat{l}_{(a+b)}\, f(b)\, \overset{*}{l}_{(a)} \left\{ \int_0^{b-2} f(x)\, \overset{*}{l}_{(a+b-x)} dx + \tfrac{1}{2}\int_{b-2}^{b-1} f(x)\, \overset{*}{l}_{(a+b-x)}\, dx + \tfrac{1}{2}\int_{b+1}^{b+2} f(x)\, \frac{\hat{l}_x}{l_b}\, \overset{*}{l}_{(a+b-x)}\, dx + \tfrac{1}{2}\int_{b+2}^{a+b} f(x)\, \frac{\hat{l}_x}{l_b}\, \overset{*}{l}_{(a+b-x)}\, dx \right\}$$

where $\overset{*}{l}_{(a+b-x)}$ is the survivorship factor from 0 to (a+b-x), because if the age of the mother was x when she gave birth to the siblings of the respondent, and her age at the time of the survey was (a+b), the age of the siblings is (a+b-x), which is the period for which the sibling was exposed to death. In order to obtain the total survivors of the siblings, each equation (4), (5), (6) and (7) is multiplied by the survivorship factor and then added.

The proportion of surviving siblings is obtained as the ratio of the surviving siblings {(9)} to the total number of siblings {(8)}. These proportions of surviving siblings are converted into the l values of the life table through the equation:

$$l_N = a + b\ {}_5S_N$$

where ${}_5S_N$ is the proportion of surviving siblings of the respondents in the age group N to N+5.

5.7.5 α and β

Table 5.20A

Calculation of β for Males. Model Life Table β value by comparison of e_x values derived from Orphanhood data (Wn method) with Logit Model Life Tables

First Iteration: $\beta = 1.0$ for estimating e_{85} with $l_2 = .815$

Age x	Life Table Survivors l_x	Life Table Population $_nL_x$	T_x	e_x $T_x \div l_x$	β = .7	β .8	β .9	β = 1.0	Implied β
(1)	(2)	(3)	(4)	(5)		(6)			(8)
37.5	10000	122562 ①	346104	34.61	33.75	31.19 ⑤	28.93	26.72	Below .7
50	9610	46882	223542	23.26	24.15	22.00	20.14	18.53	.741 or .74
55	9143	44035	176660	19.32	20.53	18.56	16.89	15.46	.761 or .76
60	8471	40482	132625	15.66	17.06	15.30	13.83	12.60	.780 or .78
65	7722	34100	92143	11.93	13.88	12.36	11.11	10.03	.834 or .83
70	5918	26755	58043	9.81	10.95	9.67	8.65	7.83	.790 or .79
75	4764	17672	31288	6.54	8.47	7.42	6.67	6.04	.921 or .92
80	2285	8968	13616	5.96	6.45	5.71	5.14	4.69	.766 or .77
85	1302	—	4648 ②	3.57 ③	4.76	4.26	3.87	3.54	1.00 or 1.0

① $_{12.5}L_{37.5} = \frac{12.5}{2}(l_{37.5} + l_{50}) = 6.5 \times 19610 = 122562$

② $T_{85} = e_{85} \times l_{85}$ $\therefore T_{85} = 3.57 \times 1302 = 4648$

③ $e_{85} = 3.57$ with $\beta = 1.0$ and $l_2 = .815$ (Blacker, p. 58).

④ The average value of β .8 for the range 50 – 80.

⑤ $e_{35} = 33.07$, $e_{40} = 29.31$ $\therefore e_{37.5} = \frac{1}{2}(33.07 + 29.31) = 31.19$

Table 5.20.B.

Calculation of β for Males. Model Life Table β values by comparison of e_x values derived from Orphanhood data (WH method) with Logit Model Life Tables

Second Iteration: $\beta = .8$ for estimating e_{85} with $l_2 = .815$

Age x	Life Table Survivors l_x	Life Table Population ${}_5L_x$	T_x	e_x $T_x \div l_x$	$\beta = .7$	$\beta = .8$	$\beta = .9$	Implied β
37.5	10000	122512	347003	34.70	33.75	31.19	28.93	Below .7
50	9610	46882	224441	23.36	24.15	22.00	20.14	.727 or .73
55	9143	44035	177559	19.42	20.53	18.56	16.99	.756 or .76
60	8471	40482	133524	15.76	17.06	15.30	13.83	.774 or .74
65	7722	34100	93042	12.05	13.88	12.36	11.11	.825 or .83
70	5918	26755	58942	9.96	10.95	9.67	8.65	.771 or .78
75	4784	17672	32187	6.73	8.47	7.46	6.67	.892 or .89
80	2285	8968	14515	6.35 (1)	6.45	5.71	5.14	.713 or .71
85	1302	–	5547	4.26 (2)	4.76	4.26	3.87	.800 or .80

(1) Cf. e_{80} females 6.4247 (Table x, B).

(2) $e_{85} = 4.26$ with $\beta = .8$ and $l_2 = 815$. (Blacker, p 58)

The average value of β for values based on $x = 60$ to 70, $\beta = .79$ and for $x = 50$ to 70, $\beta = .77$.

Estimation of α with $\beta = .76$ and $l_2 = .815$

$$\text{logit}(1-l_2) = \alpha + \beta(1-l_2^s)$$
$$-.7414 = \alpha + .76(-.7152)$$
$$\alpha = -.7414 + .5436 = -.1978$$

Table 5.21.c

Calculation of β for Males Model Life Table β value by comparison of e_x values derived from Orphanhood data (WN method) with Logit-Model life Tables $l_2 = 815$ and using l_{90} and not l_{95}

Age x	l_x	$_5L_x$	T_x	e_x	$\beta = .7$	$\beta = .8$	$\beta = .9$	$\beta = 1.0$	Implied β
37.5	10000	122562 ①	350416	35.04	33.75	31.19	28.93	26.92	Below .7 or Below .7
50	9610	46882	227854	23.71	24.15	22.00	20.14	18.53	.720 or .72
55	9143	44035	180972	19.79	20.53	18.56	16.89	15.46	.738 or .74
60	8471	40482	136937	16.17	17.06	15.30	13.83	12.60	.751 or .75
65	7722	34100	96455	12.49	13.88	12.36	11.11	10.08	.791 or .79
70	5918	26755	62355	10.54	10.95	9.67	8.65	7.83	.757 or .76
75	4784	17672	35600	7.44	8.47	7.46	6.67	6.04	.803 or .80
80	2285	8968	17928	7.85	6.45	5.71	5.14	4.69	Below .7 or Below .7
85	1302	5090	8960	6.88	4.76	4.26	3.87	3.57	Below .7 or Below .7
90	774	3870 ②	3870	5.00					

① $_{12.5}L_{37.5} = \frac{12.5}{2}(10000 + 9610) = 122562$

② $_{10}L_{90} = \frac{10}{2}(l_{90} + l_{100}) = 5(774 + 0) = 3870$ as we assume $l_{100} = 0$

If we do not consider the values of β for the extreme age groups, i.e. $x \geq 80$ or greater and $x = 37.5$ then β values lie between .7 and .8. The average of β values for $x = 60, 65, 70$ = .766 or .77.

Table 5.21. A.

Calculation of β for Females. Model Life Table β value by comparison of e_x values derived from Orphanhood data (W_N method) with Logit Model life tables

Age x (1)	Life Table Survivors l_x (2)	Life Table Population $_5L_x$ (3)	T_x (4)	Expectation of life $e_x = T_x \div l_x$ (5)	e_x values from Logit Model Life Tables $l'_2 = .845$, $\beta = .7$ (6)	$\beta = .8$ (7)	For values of e_x in col. (5) implied β (8)
25	10000	98865 (1)	459042	45.9042	44.87	41.89	Below .70 or Below .70
35	9773	48430	360177	36.8543	36.90	34.21	.7017 or .70
40	9599	47368	311747	32.4770	32.88	30.33	.7158 or .72
45	9348	46325	264379	28.2819	28.89	26.50	.7257 or .73
50	9182	45238	218054	23.7480	25.00	22.77	.7561 or .76
55	8913	42645	172816	19.3892	21.25	19.21	.7912 or .79
60	8145	37258	130171	15.9817	17.66	15.82	.7912 or .79
65	6758	31420	92913	13.7486	14.35	12.74	.7374 or .74
70	5810	25220	61493	10.5840	11.29	9.94	.7523 or .75
75	4278	17860	36273	8.4790	8.69	7.62	.7197 or .72
80	2866	–	18413 (2)	6.4247 (3)	6.56	5.78	.7173 or .72

(1) For $_{10}L_{25}$ the class interval, i.e $x = 10$ $\therefore$ $(10000 + 9773) \div \frac{10}{2} = 98865$

(2) $\frac{T_{80}}{l_{80}} = e_{80}$, since $e_{80} = 6.4247$ and $l_{80} = 2866$ $\therefore$ $\frac{T_{80}}{2866} = 6.4247 = 18413$

(3) For calculation of e_{80} see Table attached.

The average estimate of $\beta = .76$; Midpoint of Range $(.73 - .79) = .76$; Median $= .755$

Estimation of α with $\beta = .76$ and $l_2 = .845$

$\mathrm{logit}(1 - l_2) = \alpha + \beta\,(1 - l_2^s)$ $\qquad \alpha = -.3044$

Table 5.21 B.

Estimation of e_{80} for females

Age	Mother Alive	Mother Dead	Total
55-59	34	202	236
60-64	45	339	384
65-69	13	143	156
70-74	10	188	198
75-79	2	39	41
80-84	4	129	133
85+	0	50	50
Total 55+	108	1090	1198

Let P_{55+} = proportion of persons (males + females) aged 55+ with mother alive

① $\therefore$ P_{55+} = No with mother alive ÷ total = 108 ÷ 1198 = .0902

② $\bar{M}$, mean age of mothers at the time of birth = 29.2 years

③

	$\bar{M}$	a	b	c
	29	3.49	51.2	−208
	30	3.50	55.2	−253
By Interpolation	29.2	3.4920	52.0	−217

$$e_{80} = a + b \cdot P_{55+} + c\,(P_{55+})^2$$
$$= 3.4920 + 52.0\,(.0902) + (-217)(.0902)^2$$
$$= 3.4920 + 4.6904 - 1.7577 = 6.4247$$

$e_{80} = 6.4247$

Table 5.22. A.
Calculation of β for Males with Widowhood data
First Iteration: $\beta = 1.0$, $l_{22.5} = .708$, $l_2 = .815$

$\frac{l_{x+5}}{l_{22.5}}$	$l_{22.5} = .708$	$\hat{\beta} = \frac{\text{Logit}(1-l_x) - \text{logit}(1-l_2)}{\text{Logit}(1-l_x^s) - \text{Logit}(1-l_2^s)}$
$l_{30}/l_{22.5} = .9948$	$l_{30} = .9948 \times .708 = .704$	$\beta_{30} = \frac{-.4332 - (-.7414)}{-.3150 - (-.7152)} = \frac{.3082}{.4002} = .77$
$l_{35}/l_{22.5} = .9823$	$l_{35} = .9823 \times .708 = .695$	$\beta_{35} = \frac{-.4118 - (-.7414)}{-.2496 - (-.7152)} = \frac{.3296}{.4656} = .70$ — .77.
$l_{40}/l_{22.5} = .9603$	$l_{40} = .9603 \times .708 = .680$	$\beta_{40} = \frac{-.3769 - (-.7414)}{-.1816 - (-.7152)} = \frac{.3645}{.5336} = .68$ i.e. less than .70
$l_{45}/l_{22.5} = .9255$	$l_{45} = .9255 \times .708 = .655$	$\beta_{45} = \frac{-.3205 - (-.7414)}{-.1073 - (-.7152)} = \frac{.4209}{.6079} = .69$ " " " "
$l_{50}/l_{22.5} = .9105$	$l_{50} = .9105 \times .708 = .645$	$\beta_{50} = \frac{-.2986 - (-.7414)}{-.0212 - (-.7152)} = \frac{.4428}{.6940} = .63$ " " " "
$l_{55}/l_{22.5} = .8511$	$l_{55} = .8511 \times .708 = .603$	$\beta_{55} = \frac{-.2090 - (-.7414)}{.0821 - (-.7152)} = \frac{.5322}{.7973} = .66$ " " " "
$l_{60}/l_{22.5} = .7931$	$l_{60} = .7931 \times .708 = .562$	$\beta_{60} = \frac{-.1246 - (-.7414)}{.2100 - (-.7152)} = \frac{.6168}{.9252} = .66$ " " " "
$l_{65}/l_{22.5} = .6803$	$l_{65} = .6803 \times .708 = .482$	$\beta_{65} = \frac{-.360 - (-.7414)}{.3721 - (-.7152)} = \frac{.7774}{1.0873} = .71$
$l_{70}/l_{22.5} = .5938$	$l_{70} = .5938 \times .708 = .420$	$\beta_{70} = \frac{.1614 - (-.7414)}{.5818 - (-.7152)} = \frac{.9028}{1.2970} = .69$ i.e. less than 70.

"First estimate of β is taken as an average over a range of estimates based on the reports for the most reliable groups of respondents ..." If we consider the responses to be reliable only for those age groups which precede $l_{30}/l_{22.5}$ i.e. (20-29) or (25-34) or $l_{35}/l_{22.5}$, then β lies between .77 and .70. The other age groups provide an estimate of β lower than .70. So we take the first estimate of $\underline{\beta = .75}$

Table 5.22. B

Calculation of β for Males with Widowhood data

Second Iteration: $\beta = .75$, $l_{22.5} = .738$, $l_2 = 815$

$\frac{l_{x+5}}{l_{22.5}}$	$l_{22.5} = .738$	$\hat{\beta} = \frac{\text{Logit}(1-l_x) - \text{logit}(1-l_2)}{\text{Logit}(1-l_x^s) - \text{logit}(1-l_2^s)}$	
$l_{30}/l_{22.5} = .9948$	$l_{30} = .9948 \times 738 = 734$	$\beta_{30} = \frac{-.5075 - (-.7414)}{-.3150 - (-.7152)} = \frac{.2339}{.4002} = .58$ i.e less than .70	
$l_{35}/l_{22.5} = .9823$	$l_{35} = .9823 \times .738 = 725$	$\beta_{35} = \frac{-.4847 - (-.7414)}{-.2496 - (-.7152)} = \frac{.2567}{.4656} = 0.55$ " " .70	
$l_{40}/l_{22.5} = .9603$	$l_{40} = .9603 \times .738 = 709$	$\beta_{40} = \frac{-.4453 - (-.7414)}{-.1816 - (-.7152)} = \frac{.2961}{.5336} = 0.55$ " " "	
$l_{45}/l_{22.5} = .9255$	$l_{45} = .9255 \times .738 = 683$	$\beta_{45} = \frac{-.3838 - (-.7414)}{-.1073 - (-.7152)} = \frac{.3576}{.6079} = 0.58$ " " "	
$l_{50}/l_{22.5} = .9105$	$l_{50} = .9105 \times .738 = 672$	$\beta_{50} = \frac{-.3586 - (-.7414)}{-.0212 - (-.7152)} = \frac{.3828}{.6940} = 0.55$ " " "	All less than .70.
$l_{55}/l_{22.5} = .8511$	$l_{55} = .8511 \times .738 = 628$	$\beta_{55} = \frac{-.2618 - (-.7414)}{.0821 - (-.7152)} = \frac{.4796}{.7973} = 0.60$ " " "	
$l_{60}/l_{22.5} = .7931$	$l_{60} = .7931 \times .738 = 585$	$\beta_{60} = \frac{-.1717 - (-.7414)}{.2100 - (-.7152} = \frac{.5697}{.9252} = 0.61$ " " "	
$l_{65}/l_{22.5} = .6803$	$l_{65} = .6803 \times .738 = 502$	$\beta_{65} = \frac{-.0040 - (-.7414)}{.3721 - (-.7152)} = \frac{.7374}{1.0873}$ 0.67	
$l_{70}/l_{22.5} = .5938$	$l_{70} = .5938 \times 738 = 438$	$\beta_{70} = \frac{.1246 - (-.7414)}{.5818 - (-.7152)} = \frac{.8660}{1.2970} = 0.66$ " "	

The average value of β based on the older ages β_{65} an β_{70} = .665 or .67.

Table 5.22.C

Calculation of β for Males with Widowhood data

Third Iteration: $\beta = \cdot 67$, $l_{22.5} = \cdot 747$, $l_2 = 815$.

$\frac{l_{N+5}}{l_{22.5}}$	$l_{22.5} = \cdot 747$	$\hat{\beta} = \frac{\text{logit}(1-l_x) - \text{logit}(1-l_2)}{\text{logit}(1-l_x^s) - \text{logit}(1-l_2^s)}$
$l_{30}/l_{22.5} = \cdot 9948$	$l_{30} = \cdot 9948 \times \cdot 747 = \cdot 7431$	$\hat{\beta}_{30} = \frac{-\cdot 5311 - (-\cdot 7414)}{-\cdot 3150 - (-\cdot 7152)} = \frac{\cdot 2103}{\cdot 4002} = \cdot 525$
$l_{35}/l_{22.5} = \cdot 9823$	$l_{35} = \cdot 9823 \times \cdot 747 = \cdot 7338$	$\hat{\beta}_{35} = \frac{-\cdot 5070 - (-\cdot 7414)}{-\cdot 2496 - (-\cdot 7152)} = \frac{\cdot 2344}{\cdot 4656} = \cdot 503$
$l_{40}/l_{22.5} = \cdot 9603$	$l_{40} = \cdot 9603 \times \cdot 747 = \cdot 7173$	$\hat{\beta}_{40} = \frac{-\cdot 4655 - (-\cdot 7414)}{-\cdot 1816 - (-\cdot 7152)} = \frac{\cdot 2759}{\cdot 5336} = \cdot 517$
$l_{45}/l_{22.5} = \cdot 9255$	$l_{45} = \cdot 9255 \times \cdot 747 = \cdot 6913$	$\hat{\beta}_{45} = \frac{-\cdot 4031 - (-\cdot 7414)}{-\cdot 1073 - (-\cdot 7152)} = \frac{\cdot 3383}{\cdot 6079} = \cdot 557$
$l_{50}/l_{22.5} = \cdot 9105$	$l_{50} = \cdot 9105 \times \cdot 747 = \cdot 6801$	$\hat{\beta}_{50} = \frac{-\cdot 3771 - (-\cdot 7414)}{-\cdot 0212 - (-\cdot 7152)} = \frac{\cdot 3643}{\cdot 6940} = \cdot 525$
$l_{55}/l_{22.5} = \cdot 8511$	$l_{55} = \cdot 8511 \times \cdot 747 = \cdot 6358$	$\hat{\beta}_{55} = \frac{-\cdot 2786 - (-\cdot 7414)}{+\cdot 0821 - (-\cdot 7152)} = \frac{\cdot 4628}{\cdot 7973} = \cdot 580$
$l_{60}/l_{22.5} = \cdot 7931$	$l_{60} = \cdot 7931 \times \cdot 747 = \cdot 5924$	$\hat{\beta}_{60} = \frac{-\cdot 1869 - (-\cdot 7414)}{+\cdot 2100 - (-\cdot 7152)} = \frac{\cdot 5545}{\cdot 9252} = \cdot 599$
$l_{65}/l_{22.5} = \cdot 6803$	$l_{65} = \cdot 6803 \times \cdot 747 = \cdot 5082$	$\hat{\beta}_{65} = \frac{-\cdot 0164 - (-\cdot 7414)}{+\cdot 3721 - (-\cdot 7152)} = \frac{\cdot 7250}{1\cdot 0873} = \cdot 667$
$l_{70}/l_{22.5} = \cdot 5938$	$l_{70} = \cdot 5938 \times \cdot 747 = \cdot 4436$	$\hat{\beta}_{70} = \frac{+\cdot 1133 - (-\cdot 7414)}{+\cdot 5818 - (-\cdot 7152)} = \frac{\cdot 8547}{1\cdot 2970} = \cdot 659$

The average value of $\hat{\beta} = \cdot 663$ or $\cdot \underline{66}$ based on $\hat{\beta}_{65}$ and $\hat{\beta}_{70}$.

$$\alpha = -0\cdot 267$$

Table 5.23. A

Calculation of β for Females with Widowhood data.

First Iteration: $\beta = 1.0$, $l_{17.5} = .776$, $l_2 = .845$

$\frac{l_{N-5}}{l_{17.5}}$*	$l_{17.5} = .776$		$\hat{\beta} = \frac{\text{logit}(1-l_x) - \text{logit}(1-l_2)}{\text{logit}(1-l_x^s) - \text{logit}(1-l_2^s)}$		
$l_{20}/l_{17.5} = .9889$	$l_{20} = .9889 \times .776 = .7673$	$\hat{\beta}_{20}$	$= \frac{(-.5957) - (-.8480)}{(-.4551) - (-.7152)}$	$= \frac{.2523}{.2601}$	$= .97$
$l_{25}/l_{17.5} = .9816$	$l_{25} = .9816 \times .776 = .7617$	$\hat{\beta}_{25}$	$\frac{(-.5818) - (-.8480)}{(-.3829) - (-.7152)}$	$= \frac{.2662}{.3323}$	$= .80$
$l_{30}/l_{17.5} = .9798$	$l_{30} = .9798 \times .776 = .7603$	$\hat{\beta}_{30}$	$\frac{(-.5763) - (-.8480)}{(-.3150) - (-.7152)}$	$= \frac{.2717}{.4002}$	$= .68$
$l_{35}/l_{17.5} = .9473$	$l_{35} = .9473 \times .776 = .7351$	$\hat{\beta}_{35}$	$\frac{(-.5101) - (-.8480)}{(-.2496) - (-.7152)}$	$= \frac{.3379}{.4656}$	$= .73$
$l_{40}/l_{17.5} = .9079$	$l_{40} = .9079 \times .776 = .7045$	$\hat{\beta}_{40}$	$\frac{(-.4356) - (-.8480)}{(-.1816) - (-.7152)}$	$= \frac{.4124}{.5336}$	$= .77$
$l_{45}/l_{17.5} = .8859$	$l_{45} = .8859 \times .776 = .6875$	$\hat{\beta}_{45}$	$\frac{(-.3931) - (-.8480)}{(-.1073) - (-.7152)}$	$= \frac{.4549}{.6079}$	$= .75$
$l_{50}/l_{17.5} = .8647$	$l_{50} = .8647 \times .776 = .6710$	$\hat{\beta}_{50}$	$\frac{(-.3564) - (-.8480)}{(-.0212) - (-.7152)}$	$= \frac{.4916}{.6940}$	$= .71$
$l_{55}/l_{17.5} = .8098$	$l_{55} = .8098 \times .776 = .6284$	$\hat{\beta}_{55}$	$\frac{(-.2618) - (-.8480)}{(+.0821) - (-.7152)}$	$= \frac{.5862}{.7973}$	$= .74$
$l_{60}/l_{17.5} = .7718$	$l_{60} = .7718 \times .776 = .5989$	$\hat{\beta}_{60}$	$\frac{(-.2007) - (-.8480)}{(+.2100) - (-.7152)}$	$= \frac{.6473}{.9252}$	$= .70$

$\hat{\beta} = .76$ for overall average; $\hat{\beta} = .74$, average for the range $\hat{\beta} = 25$ to $\hat{\beta} = 45$; for the range 40-60 average $\hat{\beta} = \underline{.734}$; for the range 45-60 average $\hat{\beta} = .725$.

*$l_{N-5}/l_{17.5}$ obtained by $W_{(N)}$ selected on the basis of male population weighted mean age at marriage of 24.39 and the female singulate mean age at marriage of 19.56 years.

Table 5.23. B.

Calculation of β for Females with Widowhood data.
Second Iteration: $\beta = \cdot 76$, $l_{17.5} = \cdot 794$, $l_2 = \cdot 145$

$\frac{l_{N-5}}{l_{17.5}}$	$l_{17.5} = \cdot 794$	$\hat{\beta} = \frac{\text{logit}(1-l_x) - \text{logit}(1-l_2)}{\text{logit}(1-l_x^s) - \text{logit}(1-l_2^s)}$
$l_{20}/l_{17.5} = \cdot 9889$	$l_{20} = \cdot 9889 \times \cdot 794$	$\hat{\beta}_{20} = \frac{(-\cdot 6475)-(-\cdot 8480)}{(-\cdot 4551)-(-\cdot 7152)} = \frac{\cdot 2005}{\cdot 2601} = \cdot 77$
$l_{25}/l_{17.5} = \cdot 9816$	$l_{25} = \cdot 9816 \times \cdot 794$	$\hat{\beta}_{25} = \frac{(-\cdot 6299)-(-\cdot 8480)}{(-\cdot 3829)-(-\cdot 7152)} = \frac{\cdot 2181}{\cdot 3323} = \cdot 66$
$l_{30}/l_{17.5} = \cdot 9798$	$l_{30} = \cdot 9798 \times \cdot 794$	$\hat{\beta}_{30} = \frac{(-\cdot 6270)-(-\cdot 8480)}{(-\cdot 3150)-(-\cdot 7152)} = \frac{\cdot 2210}{\cdot 4002} = \cdot 55$
$l_{35}/l_{17.5} = \cdot 9473$	$l_{35} = \cdot 9473 \times \cdot 794$	$\hat{\beta}_{35} = \frac{(-\cdot 5447)-(-\cdot 8480)}{(-\cdot 2496)-(-\cdot 7152)} = \frac{\cdot 2933}{\cdot 4656} = \cdot 63$
$l_{40}/l_{17.5} = \cdot 9079$	$l_{40} = \cdot 9079 \times \cdot 794$	$\hat{\beta}_{40} = \frac{(-\cdot 4747)-(-\cdot 8480)}{(-\cdot 1816)-(-\cdot 7152)} = \frac{\cdot 3733}{\cdot 5336} = \cdot 70$
$l_{45}/l_{17.5} = \cdot 8859$	$l_{45} = \cdot 8859 \times \cdot 794$	$\hat{\beta}_{45} = \frac{(-\cdot 4308)-(-\cdot 8480)}{(-\cdot 1073)-(-\cdot 7152)} = \frac{\cdot 4172}{\cdot 6079} = \cdot 69$
$l_{50}/l_{17.5} = \cdot 8647$	$l_{50} = \cdot 8647 \times \cdot 794$	$\hat{\beta}_{50} = \frac{(-\cdot 3931)-(-\cdot 8480)}{(-\cdot 0212)-(-\cdot 7152)} = \frac{\cdot 4549}{\cdot 6940} = \cdot 66$
$l_{55}/l_{17.5} = \cdot 8098$	$l_{55} = \cdot 8098 \times \cdot 794$	$\hat{\beta}_{55} = \frac{(-\cdot 2942)-(-\cdot 8480)}{(+\cdot 0821)-(-\cdot 7152)} = \frac{\cdot 5538}{\cdot 7973} = \cdot 69$
$l_{60}/l_{17.5} = \cdot 7718$	$l_{60} = \cdot 7718 \times \cdot 794$	$\hat{\beta}_{60} = \frac{(-\cdot 2300)-(-\cdot 8480)}{(+\cdot 2100)-(-\cdot 7152)} = \frac{\cdot 6180}{\cdot 9252} = \cdot 67$

The average for the range 45 to 60 is $\hat{\beta} = \cdot 68$
" " " " 40 to 60 is $\hat{\beta} = \cdot 68$

Table 5.23.C

Calculation of β for females with widowhood data.

Third Iteration: $\beta = \cdot 68$, $l\,17.5 = \cdot 800$, $l_2 = \cdot 845$

$\frac{l_{N-5}}{l_{17.5}}$	$l_{17.5} = \cdot 800$		$\beta = \frac{\text{logit}(1-l_x) - \text{logit}(1-l_2)}{\text{logit}(1-l_x^5) - \text{logit}(1-l_2^5)}$
$l_{20}/l_{17.5} = \cdot 9819$	l_{20}	$= \cdot 9889 \times \cdot 800 = \cdot 7911$	$\hat\beta_{20} = \frac{(-\cdot 6658) - (-\cdot 8480)}{(-\cdot 4551) - (-\cdot 7152)} = \frac{\cdot 1822}{\cdot 2601} = \cdot 70$
$l_{25}/l_{17.5} = \cdot 9816$	l_{25}	$= \cdot 9816 \times \cdot 800 = \cdot 7853$	$\hat\beta_{25} = \frac{(-\cdot 6484) - (-\cdot 8480)}{(-\cdot 3829) - (-\cdot 7152)} = \frac{\cdot 1996}{\cdot 3323} = \cdot 60$
$l_{30}/l_{17.5} = \cdot 9798$	l_{30}	$= \cdot 9798 \times \cdot 800 = \cdot 7838$	$\hat\beta_{30} = \frac{(-\cdot 6440) - (-\cdot 8480)}{(-\cdot 3150) - (-\cdot 7152)} = \frac{\cdot 2040}{\cdot 4002} = \cdot 50$
$l_{35}/l_{17.5} = \cdot 9473$	l_{35}	$= \cdot 9473 \times \cdot 800 = \cdot 7578$	$\hat\beta_{35} = \frac{(-\cdot 5704) - (-\cdot 8480)}{(-\cdot 2496) - (-\cdot 7152)} = \frac{\cdot 2776}{\cdot 4656} = \cdot 60$
$l_{40}/l_{17.5} = \cdot 9079$	l_{40}	$= \cdot 9079 \times \cdot 800 = \cdot 7263$	$\hat\beta_{40} = \frac{(-\cdot 4880) - (-\cdot 8480)}{(-\cdot 1816) - (-\cdot 7152)} = \frac{\cdot 3600}{\cdot 5336} = \cdot 68$
$l_{45}/l_{17.5} = \cdot 8859$	l_{45}	$= \cdot 8859 \times \cdot 800 = \cdot 7087$	$\hat\beta_{45} = \frac{(-\cdot 4446) - (-\cdot 8480)}{(-\cdot 1073) - (-\cdot 7152)} = \frac{\cdot 4034}{\cdot 6079} = \cdot 66$
$l_{50}/l_{17.5} = \cdot 8647$	l_{50}	$= \cdot 8647 \times \cdot 800 = \cdot 6918$	$\hat\beta_{50} = \frac{(-\cdot 4042) - (-\cdot 8480)}{(-\cdot 0212) - (-\cdot 7152)} = \frac{\cdot 4438}{\cdot 6940} = \cdot 64$
$l_{55}/l_{17.5} = \cdot 8098$	l_{55}	$= \cdot 8098 \times \cdot 800 = \cdot 6478$	$\hat\beta_{55} = \frac{(-\cdot 3046) - (-\cdot 8480)}{(+\cdot 0821) - (-\cdot 7152)} = \frac{\cdot 5434}{\cdot 7973} = \cdot 68$
$l_{60}/l_{17.5} = \cdot 7718$	l_{60}	$= \cdot 7718 \times \cdot 800 = \cdot 6174$	$\hat\beta_{60} = \frac{(-\cdot 2392) - (-\cdot 8480)}{(+\cdot 2100) - (-\cdot 7152)} = \frac{\cdot 6088}{\cdot 9252} = \cdot 66$

The average for the range 40 to 60 is $\hat\beta = \cdot 664$. or $\cdot 66$

$\alpha = -0.376$

TABLE. 5.24.

Calculation of α β for males with sibling data and $l_2 = .815$

l_N	$\beta = \dfrac{\text{logit}(1-l_x) - \text{logit}(1-l_2)}{\text{logit}(1-l_x^s) - \text{logit}(1-l_2^s)}$			
$l_{10} = .7978$	$\hat{\beta}_{10}$	$\dfrac{(-.6862)-(-.7414)}{(-.5498)-(-.7152)}$	$= \dfrac{.0552}{.1654}$	$= 0.334$ ×
$l_{15} = .7983$	$\hat{\beta}_{15}$	$\dfrac{(-.6878)-(-.7414)}{(-.5131)-(-.7152)}$	$= \dfrac{.0536}{.2021}$	$= 0.265$ ×
$l_{20} = .7664$	$\hat{\beta}_{20}$	$\dfrac{(-.5941)-(-.7414)}{(-.4551)-(-.7152)}$	$= \dfrac{.1473}{.2601}$	$= 0.566$
$l_{25} = .7404$	$\hat{\beta}_{25}$	$\dfrac{(-.5240)-(-.7414)}{(-.3829)-(-.7152)}$	$= \dfrac{.2174}{.3323}$	$= 0.654$
$l_{30} = .7238$	$\hat{\beta}_{30}$	$\dfrac{(-.4817)-(-.7414)}{(-.3150)-(.7152)}$	$= \dfrac{.2597}{.4002}$	$= 0.649$
$l_{35} = .7121$	$\hat{\beta}_{35}$	$\dfrac{(-.4528)-(-.7414)}{(-.2496)-(-.7152)}$	$= \dfrac{.2886}{.4656}$	$= 0.620$
$l_{40} = .6849$	$\hat{\beta}_{40}$	$\dfrac{(-.3882)-(-.7414)}{(-.1816)-(-.7152)}$	$= \dfrac{.3532}{.5336}$	$= 0.662$
$l_{45} = .6566$	$\hat{\beta}_{45}$	$\dfrac{(-.3240)-(-.7414)}{(-.1073)-(-.7152)}$	$= \dfrac{.4174}{.6079}$	$= 0.687$
$l_{50} = .5922$	$\hat{\beta}_{50}$	$\dfrac{(-.1865)-(.7414)}{(-.0212)-(-.7152)}$	$= \dfrac{.5549}{.6940}$	$= 0.800$
$l_{55} = .5179$	$\hat{\beta}_{55}$	$\dfrac{(-.0358)-(-.7414)}{(+.0821)-(-.7152)}$	$= \dfrac{.7056}{.7973}$	$= 0.885$

× l_{15} is greater than l_{10}.

The average of $\hat{\beta}$: for $\hat{\beta}_{25}$ to $\hat{\beta}_{40} = .65$; for $\hat{\beta}_{45}$ to $\hat{\beta}_{55} = .79$; for $\hat{\beta}_{20}$ to $\hat{\beta}_{55} = \underline{.69}$

<u>Estimation of α with $\beta = .69$ and $l_2 = .815$</u>

$$\text{logit}(1-l_2) = \alpha + \beta\,\text{logit}(1-l_2^s)$$

$$-.7414 = \alpha + .69(-.7152)$$

$$= \alpha - .4935$$

$$\alpha = -.7414 + .4935 = -.02479 \text{ or } -0.248$$

TABLE 5.25

Calculating β for females with sibling data and $l_2 = .845$

l_N		$\beta = \dfrac{\text{logit}(1-l_x) - \text{logit}(1-l_2)}{\text{logit}(1-l_x^s) - \text{logit}(1-l_2^s)}$		
$l_{10} = .8031^{x}$	$\hat{\beta}_{10}$	$= \dfrac{(-.7029)-(-.8480)}{(-.5493)-(-.7152)}$	$= \dfrac{.1451}{.1654}$	$= .877$ } x
$l_{15} = .8181^{x}$	$\hat{\beta}_{15}$	$\dfrac{(-.7517)-(-.8480)}{(-.5131)-(-.7152)}$	$= \dfrac{.0963}{.2021}$	$= .476$ } x
$l_{20} = .7990$	$\hat{\beta}_{20}$	$\dfrac{(-.6900)-(-.8480)}{(-.4551)-(-.7152)}$	$= \dfrac{.1580}{.2601}$	$= .607$
$l_{25} = .7786$	$\hat{\beta}_{25}$	$\dfrac{(-.6288)-(-.8480)}{(-.3829)-(-.7152)}$	$= \dfrac{.2192}{.3323}$	$= .660$
$l_{30} = .7499$	$\hat{\beta}_{30}$	$\dfrac{(-.5490)-(-.8480)}{(-.3150)-(-.7152)}$	$= \dfrac{.2990}{.4002}$	$= .749$
$l_{35} = .7039$	$\hat{\beta}_{35}$	$\dfrac{(-.4330)-(-.8480)}{(-.2496)-(-.7152)}$	$= \dfrac{.4150}{.4656}$	$= .891$
$l_{40} = .6701$	$\hat{\beta}_{40}$	$\dfrac{(-.3543)-(-.8480)}{(-.1816)-(-.7152)}$	$= \dfrac{.4937}{.5336}$	$= .925$
$l_{45} = .6245$	$\hat{\beta}_{45}$	$\dfrac{(-.2543)-(-.8480)}{(-.1073)-(-.7152)}$	$= \dfrac{.5937}{.6079}$	$= .977$
$l_{50} = .6179^{x}$	$\hat{\beta}_{50}$	$\dfrac{(-.2403)-(-.8480)}{(-.0212)-(-.7152)}$	$= \dfrac{.6077}{.6940}$	$= .876$ } x
$l_{55} = .6197^{x}$	$\hat{\beta}_{55}$	$\dfrac{(-.2441)-(-.8480)}{(+.0821)-(-.7152)}$	$= \dfrac{.6039}{.7973}$	$= .757$ } x

x l_{15} is greater than l_{10} and l_{55} greater than l_{50} ∴ these values ignored

The average of $\hat{\beta}$: for $\hat{\beta}_{20}$ to $\hat{\beta}_{30} = .67$, for $\hat{\beta}_{35}$ to $\hat{\beta}_{45} = .93$; for $\hat{\beta}_{20}$ to $\hat{\beta}_{45} = .80$

Estimation of α with $\beta = .67$ and $l_2 = .845$: $\text{logit}(1-l_2) = \alpha + \beta\,\text{logit}(1-l_2^s)$

$$-.8480 = \alpha + .67(-.7152)$$
$$= \alpha - .4792$$
$$\alpha = -.8480 + .4792 = -.3688 \text{ or } -0.369$$

$\alpha = -.3688$ and $\beta = .67$.

5.7.6 Life tables from the standard methods

TABLE 5.26.A

COMPLETE MODEL LIFE TABLES ORPHANHOOD

AGE	PROBABILITY OF DYING		LIFE TABLE SURVIVORS		AGE-SPECIFIC MORTALITY RATE		EXPECTATION OF LIFE		AGE
	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	
0	.1527	.1271	1000	1000	.1710	.1395	50.2	53.9	0
1	.0381	.0319	847	873	.0390	.0326	58.2	60.7	1
2	.0174	.0146	815	845	.0175	.0147	59.5	61.7	2
3	.0102	.0086	801	833	.0103	.0086	59.5	61.6	3
4	.0065	.0055	793	826	.0065	.0055	59.2	61.2	4
5	.0044	.0037	787	821	.0044	.0037	58.5	60.5	5
6	.0037	.0031	784	818	.0037	.0031	57.8	59.7	6
7	.0033	.0028	781	815	.0033	.0028	57.0	58.9	7
8	.0030	.0025	778	813	.0030	.0025	56.2	58.1	8
9	.0027	.0023	776	811	.0027	.0023	55.4	57.2	9
10	.0023	.0019	774	809	.0023	.0020	54.5	56.3	10
11	.0023	.0019	772	808	.0023	.0019	53.6	55.5	11
12	.0024	.0020	770	806	.0024	.0020	52.8	54.6	12
13	.0027	.0023	769	804	.0027	.0023	51.9	53.7	13
14	.0032	.0027	767	803	.0032	.0027	51.0	52.8	14
15	.0032	.0027	764	800	.0032	.0027	50.2	51.9	15
16	.0037	.0031	762	798	.0037	.0031	49.4	51.1	16
17	.0043	.0037	759	796	.0043	.0037	48.5	50.2	17
18	.0049	.0041	756	793	.0049	.0041	47.7	49.4	18
19	.0054	.0046	752	790	.0054	.0046	47.0	48.6	19
20	.0058	.0049	748	786	.0058	.0049	46.2	47.8	20
21	.0060	.0051	744	782	.0060	.0051	45.5	47.1	21
22	.0058	.0049	739	778	.0058	.0049	44.8	46.3	22
23	.0057	.0048	735	774	.0057	.0048	44.0	45.5	23
24	.0055	.0047	731	771	.0055	.0047	43.3	44.8	24
25	.0060	.0051	727	767	.0060	.0051	42.5	44.0	25
26	.0058	.0050	722	763	.0058	.0050	41.8	43.2	26
27	.0059	.0050	718	759	.0059	.0050	41.0	42.4	27
28	.0058	.0050	714	755	.0058	.0050	40.2	41.6	28
29	.0058	.0049	710	752	.0058	.0049	39.5	40.8	29
30	.0058	.0050	706	748	.0059	.0050	38.7	40.0	30
31	.0060	.0051	702	744	.0060	.0051	37.9	39.2	31
32	.0060	.0052	697	740	.0060	.0052	37.1	38.4	32
33	.0062	.0053	693	737	.0062	.0053	36.4	37.6	33
34	.0062	.0053	689	733	.0062	.0054	35.6	36.8	34
35	.0064	.0055	685	729	.0064	.0055	34.8	36.0	35
36	.0065	.0056	680	725	.0066	.0056	34.0	35.2	36
37	.0067	.0058	676	721	.0067	.0058	33.2	34.4	37
38	.0069	.0060	671	716	.0069	.0060	32.5	33.6	38
39	.0071	.0062	667	712	.0071	.0062	31.7	32.8	39
40	.0073	.0063	662	708	.0074	.0064	30.9	32.0	40
41	.0075	.0065	657	703	.0076	.0065	30.1	31.2	41
42	.0079	.0069	652	699	.0079	.0069	29.4	30.4	42
43	.0082	.0071	647	694	.0082	.0071	28.6	29.6	43
44	.0085	.0074	642	689	.0086	.0074	27.8	28.8	44
45	.0090	.0078	636	684	.0090	.0078	27.1	28.0	45
46	.0094	.0083	630	679	.0094	.0082	26.3	27.2	46
47	.0094	.0085	625	673	.0098	.0086	25.5	26.5	47

51	.0121	.0106	598	648	.0122	.0107	22.6	23.4	51
52	.0128	.0113	591	642	.0129	.0113	21.8	22.6	52
53	.0136	.0120	584	634	.0137	.0121	21.1	21.9	53
54	.0144	.0127	576	627	.0145	.0128	20.4	21.1	54
55	.0154	.0136	567	619	.0155	.0137	19.7	20.4	55
56	.0164	.0145	559	610	.0165	.0146	19.0	19.7	56
57	.0175	.0155	549	601	.0177	.0156	18.3	19.0	57
58	.0187	.0166	540	592	.0189	.0168	17.6	18.3	58
59	.0200	.0178	530	582	.0202	.0179	16.9	17.6	59
60	.0215	.0192	519	572	.0217	.0194	16.3	16.9	60
61	.0230	.0205	508	561	.0232	.0208	15.6	16.2	61
62	.0247	.0222	496	549	.0250	.0224	15.0	15.5	62
63	.0266	.0240	484	537	.0270	.0242	14.4	14.9	63
64	.0286	.0258	471	524	.0291	.0262	13.7	14.2	64
65	.0309	.0280	458	511	.0314	.0284	13.1	13.6	65
66	.0335	.0304	443	497	.0340	.0308	12.5	12.9	66
67	.0361	.0329	429	481	.0368	.0334	11.9	12.3	67
68	.0391	.0357	413	466	.0399	.0364	11.4	11.7	68
69	.0423	.0388	397	449	.0432	.0396	10.8	11.2	69
70	.0460	.0424	380	432	.0471	.0433	10.3	10.6	70
71	.0499	.0461	363	413	.0512	.0472	9.7	10.0	71
72	.0543	.0504	345	394	.0559	.0517	9.2	9.5	72
73	.0591	.0551	326	374	.0609	.0566	8.7	9.0	73
74	.0643	.0602	307	354	.0665	.0621	8.2	8.5	74
75	.0702	.0660	287	332	.0727	.0683	7.8	8.0	75
76	.0766	.0724	267	310	.0796	.0751	7.3	7.5	76
77	.0836	.0794	246	288	.0873	.0827	6.9	7.0	77
78	.0914	.0872	226	265	.0958	.0912	6.5	6.6	78
79	.0998	.0956	205	242	.1050	.1004	6.1	6.2	79
80	.1092	.1050	185	219	.1155	.1109	5.7	5.8	80
81	.1192	.1153	164	196	.1268	.1223	5.3	5.4	81
82	.1303	.1265	145	173	.1394	.1350	5.0	5.1	82
83	.1422	.1387	126	151	.1531	.1490	4.7	4.7	83
84	.1553	.1520	108	130	.1684	.1645	4.3	4.4	84
85	.1693	.1663	91	111	.1849	.1814	4.1	4.1	85
86	.1844	.1818	76	92	.2032	.1999	3.8	3.8	86
87	.2004	.1941	62	75	.2228	.2199	3.5	3.5	87
88	.2177	.2157	49	60	.2442	.2418	3.3	3.3	88
89	.2360	.2343	39	47	.2676	.2654	3.0	3.1	89
90	.2554	.2541	30	36	.2928	.2910	2.8	2.8	90
91	.2757	.2747	22	27	.3198	.3184	2.6	2.6	91
92	.2972	.2964	16	20	.3491	.3480	2.4	2.4	92
93	.3254	.3248	11	14	.3886	.3878	2.3	2.3	93
94	.3380	.3376	8	9	.4068	.4062	2.1	2.1	94
95	.3690	.3647	5	6	.4524	.4520	1.9	1.9	95
96	.3930	.3929	3	4	.4892	.4889	1.8	1.8	96
97	.4205	.4204	2	2	.5325	.5323	1.6	1.6	97
98	.4484	.4483	1	1	.5779	.5778	1.3	1.3	98
99	.4785	.4785	1	1	.4684	.4684	1.0	1.0	99

TABLE 5.26.B

ABRIDGED MODEL LIFE TABLES ORPHANHOOD

AGE	PROBABILITY OF DYING		LIFE TABLE SURVIVORS		AGE-SPECIFIC MORTALITY RATE		EXPECTATION OF LIFE		AGE
	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	
0	.1527	.1271	1000	1000	.1710	.1395	50.2	53.9	0
1	.0706	.0594	847	873	.0186	.0155	58.2	60.7	1
5	.0171	.0144	787	821	.0034	.0029	58.5	60.5	5
10	.0128	.0108	774	809	.0026	.0022	54.5	56.3	10
15	.0213	.0181	764	800	.0043	.0036	50.2	51.9	15
20	.0284	.0242	748	786	.0058	.0049	46.2	47.8	20
25	.0289	.0247	727	767	.0059	.0050	42.5	44.0	25
30	.0298	.0257	706	748	.0061	.0052	38.7	40.0	30
35	.0332	.0287	685	729	.0068	.0058	34.8	36.0	35
40	.0389	.0338	662	708	.0079	.0069	30.9	32.0	40
45	.0484	.0423	636	684	.0099	.0086	27.1	28.0	45
50	.0629	.0554	605	655	.0130	.0114	23.3	24.1	50
55	.0850	.0756	567	619	.0177	.0157	19.7	20.4	55
60	.1185	.1068	519	572	.0251	.0225	16.3	16.9	60
65	.1692	.1552	458	511	.0368	.0335	13.1	13.6	65
70	.2454	.2297	380	432	.0558	.0517	10.3	10.6	70
75	.3565	.3415	287	332	.0867	.0822	7.8	8.0	75
80	.5056	.4948	185	219	.1370	.1328	5.7	5.8	80
85	.6762	.6715	91	111	.2156	.2127	4.1	4.1	85
90	.8307	.8298	30	36	.3319	.3306	2.8	2.8	90
95	.9361	.9361	5	6	.4870	.4867	1.9	1.9	95

TABLE 5.27.A

COMPLETE MODEL LIFE TABLES WIDOWHOOD

AGE	PROBABILITY OF DYING MALES	PROBABILITY OF DYING FEMALES	LIFE TABLE SURVIVORS MALES	LIFE TABLE SURVIVORS FEMALES	AGE-SPECIFIC MORTALITY RATE MALES	AGE-SPECIFIC MORTALITY RATE FEMALES	EXPECTATION OF LIFE MALES	EXPECTATION OF LIFE FEMALES	AGE
0	.1567	.1305	1000	1000	.1760	.1436	53.1	56.9	0
1	.0336	.0281	843	869	.0343	.0286	61.9	64.4	1
2	.0150	.0126	815	845	.0151	.0127	63.1	65.2	2
3	.0088	.0074	803	834	.0088	.0074	63.0	65.1	3
4	.0055	.0047	796	828	.0056	.0047	62.5	64.5	4
5	.0038	.0032	791	824	.0038	.0032	61.9	63.8	5
6	.0032	.0027	788	822	.0032	.0027	61.1	63.0	6
7	.0028	.0024	786	820	.0028	.0024	60.3	62.2	7
8	.0025	.0021	784	818	.0025	.0021	59.5	61.4	8
9	.0023	.0020	782	816	.0023	.0020	58.7	60.5	9
10	.0020	.0016	780	814	.0020	.0016	57.8	59.6	10
11	.0019	.0016	778	813	.0019	.0016	56.9	58.7	11
12	.0020	.0017	777	812	.0020	.0017	56.0	57.8	12
13	.0023	.0019	775	810	.0023	.0019	55.1	56.9	13
14	.0027	.0023	773	809	.0027	.0023	54.3	56.0	14
15	.0027	.0023	771	807	.0027	.0023	53.4	55.1	15
16	.0031	.0026	769	805	.0031	.0026	52.5	54.2	16
17	.0036	.0031	767	803	.0036	.0031	51.7	53.4	17
18	.0041	.0034	764	800	.0041	.0034	50.9	52.6	18
19	.0045	.0039	761	798	.0045	.0038	50.1	51.7	19
20	.0048	.0041	758	795	.0048	.0041	49.3	50.9	20
21	.0050	.0042	754	791	.0050	.0042	48.6	50.1	21
22	.0048	.0041	750	788	.0048	.0041	47.8	49.3	22
23	.0047	.0040	747	785	.0047	.0040	47.0	48.5	23
24	.0046	.0039	743	782	.0046	.0039	46.2	47.7	24
25	.0049	.0042	740	779	.0049	.0042	45.5	46.9	25
26	.0048	.0041	736	775	.0048	.0041	44.7	46.1	26
27	.0048	.0041	732	772	.0048	.0041	43.9	45.3	27
28	.0048	.0041	729	769	.0048	.0041	43.1	44.5	28
29	.0047	.0040	725	766	.0047	.0040	42.3	43.7	29
30	.0048	.0041	722	763	.0048	.0041	41.5	42.8	30
31	.0049	.0042	719	760	.0049	.0042	40.7	42.0	31
32	.0049	.0042	715	756	.0049	.0042	39.9	41.2	32
33	.0050	.0043	712	753	.0051	.0043	39.1	40.4	33
34	.0051	.0043	708	750	.0051	.0044	38.3	39.5	34
35	.0052	.0044	704	747	.0052	.0044	37.5	38.7	35
36	.0053	.0046	701	743	.0053	.0046	36.7	37.9	36
37	.0055	.0047	697	740	.0055	.0047	35.9	37.1	37
38	.0056	.0048	693	737	.0056	.0048	35.1	36.2	38
39	.0058	.0050	689	733	.0058	.0050	34.3	35.4	39
40	.0059	.0051	685	729	.0059	.0051	33.4	34.6	40
41	.0061	.0052	681	726	.0061	.0052	32.6	33.7	41
42	.0064	.0055	677	722	.0064	.0055	31.8	32.9	42
43	.0066	.0057	673	718	.0066	.0057	31.0	32.1	43
44	.0069	.0059	668	714	.0069	.0059	30.2	[illegible]	

51	.0096	.0084	632	680	.0097	.0084	24.8	25.6	51
52	.0102	.0089	626	675	.0103	.0089	24.0	24.9	52
53	.0108	.0095	620	669	.0109	.0095	23.2	24.1	53
54	.0114	.0100	613	662	.0115	.0100	22.5	23.3	54
55	.0122	.0107	606	656	.0123	.0107	21.8	22.5	55
56	.0130	.0114	599	649	.0131	.0114	21.0	21.6	56
57	.0138	.0121	591	641	.0139	.0122	20.3	21.0	57
58	.0148	.0130	583	633	.0149	.0131	19.6	20.3	58
59	.0157	.0139	574	625	.0159	.0140	18.8	19.5	59
60	.0169	.0149	565	617	.0171	.0151	18.1	18.8	60
61	.0181	.0160	555	607	.0182	.0161	17.4	18.1	61
62	.0194	.0172	545	598	.0196	.0174	16.8	17.4	62
63	.0209	.0186	535	587	.0211	.0188	16.1	16.7	63
64	.0225	.0200	524	576	.0227	.0202	15.4	16.0	64
65	.0242	.0217	512	565	.0245	.0219	14.8	15.3	65
66	.0262	.0235	499	553	.0266	.0238	14.1	14.6	66
67	.0283	.0255	486	540	.0287	.0258	13.5	13.9	67
68	.0306	.0276	473	526	.0311	.0280	12.9	13.3	68
69	.0332	.0300	458	511	.0337	.0305	12.2	12.7	69
70	.0361	.0329	443	496	.0368	.0333	11.6	12.0	70
71	.0392	.0357	427	480	.0400	.0364	11.1	11.4	71
72	.0428	.0391	410	463	.0437	.0399	10.5	10.8	72
73	.0466	.0428	393	445	.0477	.0437	9.9	10.2	73
74	.0508	.0469	374	426	.0521	.0480	9.4	9.7	74
75	.0556	.0515	355	406	.0572	.0528	8.9	9.1	75
76	.0609	.0566	336	385	.0628	.0583	8.4	8.6	76
77	.0667	.0623	315	363	.0690	.0643	7.9	8.1	77
78	.0732	.0688	294	340	.0760	.0712	7.4	7.6	78
79	.0803	.0758	273	317	.0837	.0788	7.0	7.1	79
80	.0883	.0838	251	293	.0924	.0874	6.5	6.7	80
81	.0970	.0925	229	268	.1020	.0970	6.1	6.2	81
82	.1067	.1022	206	244	.1127	.1077	5.7	5.8	82
83	.1173	.1129	184	219	.1246	.1196	5.3	5.4	83
84	.1289	.1247	163	194	.1378	.1330	5.0	5.0	84
85	.1415	.1375	142	170	.1523	.1477	4.6	4.7	85
86	.1553	.1516	122	146	.1684	.1640	4.3	4.3	86
87	.1700	.1666	103	124	.1858	.1818	4.0	4.0	87
88	.1860	.1829	85	104	.2050	.2014	3.7	3.7	88
89	.2030	.2004	69	85	.2259	.2227	3.4	3.5	89
90	.2211	.2199	55	68	.2486	.2458	3.2	3.2	90
91	.2402	.2384	43	53	.2730	.2706	3.0	3.0	91
92	.2604	.2549	33	40	.2994	.2974	2.7	2.8	92
93	.2868	.2856	24	30	.3348	.3332	2.5	2.5	93
94	.2990	.2981	17	21	.3516	.3504	2.3	2.4	94
95	.3279	.3273	12	15	.3922	.3913	2.1	2.1	95
96	.3507	.3502	8	10	.4252	.4246	1.9	1.9	96
97	.3766	.3763	5	7	.4639	.4635	1.7	1.7	97
98	.4029	.4027	3	4	.5046	.5043	1.4	1.4	98
99	.4315	.4314	2	2	.4038	.4037	1.1	1.1	99

TABLE 5.27.B

ABRIDGED MODEL LIFE TABLES WIDOWHOOD

AGE	PROBABILITY OF DYING		LIFE TABLE SURVIVORS		AGE-SPECIFIC MORTALITY RATE		EXPECTATION OF LIFE		AGE
	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	
0	.1567	.1305	1000	1000	.1760	.1436	53.1	56.9	0
1	.0617	.0519	843	869	.0161	.0135	61.9	64.4	1
5	.0145	.0123	791	824	.0029	.0025	61.9	63.8	5
10	.0108	.0091	780	814	.0022	.0018	57.8	59.6	10
15	.0179	.0151	771	807	.0036	.0030	53.4	55.1	15
20	.0237	.0201	758	795	.0048	.0041	49.3	50.9	20
25	.0238	.0203	740	779	.0048	.0041	45.5	46.9	25
30	.0244	.0204	722	763	.0049	.0042	41.5	42.8	30
35	.0270	.0232	704	747	.0055	.0047	37.5	38.7	35
40	.0314	.0271	685	729	.0064	.0055	33.4	34.6	40
45	.0389	.0338	664	710	.0079	.0069	29.5	30.5	45
50	.0502	.0439	638	686	.0103	.0090	25.5	26.4	50
55	.0676	.0596	606	656	.0140	.0123	21.8	22.5	55
60	.0940	.0838	565	617	.0197	.0175	18.1	18.8	60
65	.1347	.1219	512	565	.0288	.0259	14.8	15.3	65
70	.1977	.1823	443	496	.0437	.0400	11.6	12.0	70
75	.2945	.2779	355	406	.0688	.0643	8.9	9.1	75
80	.4345	.4203	251	293	.1113	.1065	6.5	6.7	80
85	.6095	.6016	142	170	.1808	.1769	4.6	4.7	85
90	.7812	.7790	55	68	.2862	.2840	3.2	3.2	90
95	.9077	.9074	12	15	.4251	.4245	2.1	2.1	95

TABLE 5.2.8.A

COMPLETE MODEL LIFE TABLES SIBLINGS

AGE	PROBABILITY OF DYING MALES	PROBABILITY OF DYING FEMALES	LIFE TABLE SURVIVORS MALES	LIFE TABLE SURVIVORS FEMALES	AGE-SPECIFIC MORTALITY RATE MALES	AGE-SPECIFIC MORTALITY RATE FEMALES	EXPECTATION OF LIFE MALES	EXPECTATION OF LIFE FEMALES	AGE
0	.1555	.1302	1000	1000	.1745	.1432	52.2	56.6	0
1	.0350	.0285	845	870	.0357	.0290	60.8	64.0	1
2	.0157	.0128	815	845	.0158	.0129	62.0	64.9	2
3	.0092	.0075	802	834	.0093	.0075	61.9	64.7	3
4	.0058	.0047	795	828	.0058	.0048	61.5	64.2	4
5	.0040	.0032	790	824	.0040	.0032	60.9	63.5	5
6	.0033	.0027	787	821	.0033	.0027	60.1	62.7	6
7	.0030	.0024	784	819	.0030	.0024	59.3	61.9	7
8	.0027	.0022	782	817	.0027	.0022	58.5	61.0	8
9	.0024	.0020	780	815	.0024	.0020	57.6	60.1	9
10	.0021	.0017	778	814	.0021	.0017	56.8	59.3	10
11	.0020	.0017	776	812	.0020	.0017	55.9	58.4	11
12	.0021	.0018	775	811	.0022	.0018	55.0	57.5	12
13	.0024	.0019	773	810	.0024	.0019	54.1	56.6	13
14	.0028	.0023	771	808	.0028	.0023	53.2	55.7	14
15	.0028	.0023	769	806	.0028	.0023	52.4	54.8	15
16	.0033	.0027	767	804	.0033	.0027	51.5	53.9	16
17	.0038	.0031	765	802	.0038	.0031	50.7	53.1	17
18	.0043	.0035	762	800	.0043	.0035	49.9	52.2	18
19	.0048	.0039	758	797	.0048	.0039	49.1	51.4	19
20	.0051	.0042	755	794	.0051	.0042	48.4	50.6	20
21	.0053	.0043	751	790	.0053	.0043	47.6	49.8	21
22	.0051	.0042	747	787	.0051	.0042	46.8	49.0	22
23	.0050	.0041	743	784	.0050	.0041	46.1	48.2	23
24	.0048	.0040	739	781	.0049	.0040	45.3	47.4	24
25	.0052	.0043	736	777	.0053	.0043	44.5	46.6	25
26	.0051	.0042	732	774	.0051	.0042	43.8	45.8	26
27	.0051	.0042	728	771	.0051	.0042	43.0	45.0	27
28	.0051	.0042	724	768	.0051	.0042	42.2	44.2	28
29	.0050	.0041	721	764	.0050	.0041	41.4	43.4	29
30	.0051	.0042	717	761	.0051	.0042	40.6	42.5	30
31	.0052	.0043	714	758	.0052	.0043	39.8	41.7	31
32	.0052	.0043	710	755	.0052	.0043	39.0	40.9	32
33	.0054	.0044	706	752	.0054	.0044	38.2	40.1	33
34	.0054	.0044	702	748	.0054	.0044	37.4	39.3	34
35	.0055	.0045	699	745	.0055	.0045	36.6	38.4	35
36	.0057	.0047	695	742	.0057	.0047	35.8	37.6	36
37	.0058	.0048	691	738	.0058	.0048	35.0	36.8	37
38	.0060	.0049	687	735	.0060	.0049	34.2	35.9	38
39	.0062	.0051	683	731	.0062	.0051	33.4	35.1	39
40	.0063	.0052	678	727	.0063	.0052	32.7	34.3	40
41	.0065	.0054	674	724	.0065	.0054	31.9	33.5	41
42	.0068	.0056	670	720	.0068	.0056	31.1	32.7	42
43	.0070	.0058	665	716	.0071	.0058	30.3	31.8	43
44	.0073	.0061	660	711	.0074	.0061	29.5	31.0	44
45	.0077	.0064	656	707	.0078	.0064	28.7	30.2	45
46	.0080	.0066	651	703	.0081	.0067	[illegible]	[illegible]	

51	.0104	.0086	622	677	.0104	.0086	24.1	25.4	51
52	.0110	.0091	616	671	.0110	.0092	23.3	24.6	52
53	.0116	.0097	609	665	.0117	.0097	22.6	23.8	53
54	.0123	.0102	602	659	.0124	.0103	21.8	23.1	54
55	.0131	.0110	594	652	.0132	.0110	21.1	22.3	55
56	.0140	.0117	587	645	.0141	.0117	20.4	21.5	56
57	.0149	.0125	578	637	.0150	.0125	19.7	20.8	57
58	.0159	.0133	570	629	.0160	.0134	18.9	20.0	58
59	.0169	.0142	561	621	.0171	.0143	18.2	19.3	59
60	.0182	.0153	551	612	.0184	.0155	17.5	18.6	60
61	.0195	.0164	541	603	.0197	.0165	16.9	17.9	61
62	.0209	.0177	531	593	.0212	.0178	16.2	17.2	62
63	.0226	.0191	520	582	.0228	.0193	15.5	16.5	63
64	.0242	.0206	508	571	.0245	.0208	14.9	15.8	64
65	.0262	.0223	496	559	.0265	.0225	14.2	15.1	65
66	.0283	.0242	483	547	.0287	.0244	13.6	14.4	66
67	.0306	.0262	469	534	.0310	.0265	13.0	13.8	67
68	.0331	.0284	455	520	.0336	.0288	12.4	13.1	68
69	.0358	.0306	440	505	.0365	.0313	11.8	12.5	69
70	.0390	.0337	424	489	.0398	.0343	11.2	11.9	70
71	.0423	.0367	407	473	.0432	.0374	10.6	11.3	71
72	.0461	.0402	390	456	.0472	.0410	10.1	10.7	72
73	.0502	.0439	372	437	.0515	.0449	9.5	10.1	73
74	.0546	.0481	353	418	.0563	.0493	9.0	9.5	74
75	.0599	.0529	334	398	.0617	.0543	8.5	9.0	75
76	.0655	.0581	314	377	.0677	.0599	8.0	8.5	76
77	.0717	.0640	293	355	.0744	.0661	7.6	8.0	77
78	.0787	.0706	272	332	.0819	.0732	7.1	7.5	78
79	.0861	.0776	251	309	.0900	.0809	6.7	7.0	79
80	.0946	.0854	229	285	.0993	.0897	6.2	6.6	80
81	.1037	.0948	208	260	.1094	.0995	5.8	6.1	81
82	.1136	.1047	186	236	.1207	.1104	5.5	5.7	82
83	.1249	.1155	165	211	.1332	.1226	5.1	5.3	83
84	.1370	.1275	144	187	.1470	.1362	4.8	5.0	84
85	.1500	.1405	125	163	.1622	.1511	4.4	4.5	85
86	.1643	.1547	106	140	.1790	.1677	4.1	4.3	86
87	.1794	.1699	88	118	.1971	.1857	3.8	4.0	87
88	.1958	.1864	73	98	.2170	.2055	3.6	3.7	88
89	.2132	.2039	58	80	.2387	.2271	3.3	3.4	89
90	.2316	.2226	46	64	.2621	.2505	3.1	3.2	90
91	.2512	.2422	35	49	.2873	.2756	2.9	2.9	91
92	.2716	.2629	26	37	.3146	.3028	2.6	2.7	92
93	.2987	.2897	19	28	.3512	.3388	2.4	2.5	93
94	.3111	.3073	13	20	.3684	.3561	2.3	2.3	94
95	.3400	.3316	9	14	.4105	.3975	2.1	2.1	95
96	.3638	.3547	6	9	.4446	.4311	1.9	1.9	96
97	.3902	.3809	4	6	.4847	.4705	1.7	1.7	97
98	.4170	.4075	2	4	.5268	.5118	1.4	1.4	98
99	.4461	.4363	1	2	.4232	.4102	1.1	1.1	99

TABLE 5.28.B

ABRIDGED MODEL LIFE TABLES SIBLINGS

AGE	PROBABILITY OF DYING		LIFE TABLE SURVIVORS		AGE-SPECIFIC MORTALITY RATE		EXPECTATION OF LIFE		AGE
	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	
0	.1555	.1302	1000	1000	.1745	.1432	52.2	56.6	0
1	.0644	.0527	845	870	.0169	.0137	60.8	64.0	1
5	.0153	.0125	790	824	.0031	.0025	60.9	63.5	5
10	.0114	.0093	778	814	.0023	.0019	56.8	59.3	10
15	.0189	.0154	769	806	.0038	.0031	52.4	54.8	15
20	.0251	.0205	755	794	.0051	.0041	48.4	50.6	20
25	.0253	.0208	736	777	.0051	.0042	44.5	46.6	25
30	.0260	.0214	717	761	.0053	.0043	40.6	42.5	30
35	.0288	.0238	699	745	.0058	.0048	36.6	38.4	35
40	.0336	.0276	678	727	.0068	.0056	32.7	34.3	40
45	.0416	.0346	656	707	.0085	.0070	28.7	30.2	45
50	.0539	.0450	628	683	.0111	.0092	24.8	26.2	50
55	.0726	.0611	594	652	.0150	.0126	21.1	22.3	55
60	.1011	.0860	551	612	.0213	.0179	17.5	18.6	60
65	.1448	.1251	496	559	.0311	.0266	14.2	15.1	65
70	.2119	.1670	424	489	.0472	.0411	11.2	11.9	70
75	.3134	.2643	334	398	.0741	.0660	8.5	9.0	75
80	.4569	.4282	229	285	.1191	.1091	6.2	6.6	80
85	.6312	.6094	125	163	.1915	.1805	4.4	4.6	85
90	.7976	.7648	46	64	.3002	.2889	3.1	3.2	90
95	.9174	.9106	9	14	.4439	.4308	2.1	2.1	95

TABLE 5.29A

COMPLETE MODEL LIFE TABLES COMBINED

AGE	PROBABILITY OF DYING		LIFE TABLE SURVIVORS		AGE-SPECIFIC MORTALITY RATE		EXPECTATION OF LIFE		AGE
	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	
0	.1551	.1291	1000	1000	.1739	.1420	51.9	55.7	0
1	.0354	.0297	845	871	.0362	.0302	60.4	62.9	1
2	.0160	.0134	815	845	.0161	.0135	61.6	63.8	2
3	.0094	.0079	802	834	.0094	.0079	61.6	63.6	3
4	.0059	.0050	794	827	.0059	.0050	61.2	63.1	4
5	.0040	.0034	790	823	.0040	.0034	60.5	62.5	5
6	.0034	.0029	787	820	.0034	.0029	59.8	61.7	6
7	.0030	.0026	784	818	.0030	.0026	59.0	60.9	7
8	.0027	.0023	782	816	.0027	.0023	58.1	60.0	8
9	.0025	.0021	779	814	.0025	.0021	57.3	59.1	9
10	.0021	.0018	778	812	.0021	.0018	56.4	58.3	10
11	.0021	.0018	776	811	.0021	.0018	55.6	57.4	11
12	.0022	.0018	774	809	.0022	.0018	54.7	56.5	12
13	.0024	.0021	773	808	.0024	.0021	53.8	55.6	13
14	.0029	.0024	771	806	.0029	.0024	52.9	54.7	14
15	.0029	.0024	769	804	.0029	.0024	52.1	53.8	15
16	.0033	.0028	766	802	.0034	.0028	51.2	52.9	16
17	.0039	.0033	764	800	.0039	.0033	50.4	52.1	17
18	.0044	.0037	761	797	.0044	.0037	49.6	51.3	18
19	.0049	.0041	757	794	.0049	.0041	48.8	50.4	19
20	.0052	.0044	754	791	.0052	.0044	48.0	49.7	20
21	.0054	.0046	750	788	.0054	.0046	47.3	48.9	21
22	.0052	.0044	746	784	.0052	.0044	46.5	48.1	22
23	.0051	.0043	742	781	.0051	.0043	45.8	47.3	23
24	.0049	.0042	738	777	.0049	.0042	45.0	46.5	24
25	.0053	.0045	735	774	.0054	.0046	44.2	45.7	25
26	.0052	.0044	731	770	.0052	.0044	43.5	44.9	26
27	.0052	.0045	727	767	.0052	.0045	42.7	44.1	27
28	.0052	.0044	723	764	.0052	.0044	41.9	43.3	28
29	.0051	.0044	719	760	.0051	.0044	41.1	42.5	29
30	.0052	.0044	716	757	.0052	.0045	40.3	41.7	30
31	.0053	.0045	712	754	.0053	.0046	39.5	40.9	31
32	.0053	.0046	708	750	.0053	.0046	38.8	40.0	32
33	.0055	.0047	704	747	.0055	.0047	38.0	39.2	33
34	.0055	.0047	700	743	.0055	.0047	37.2	38.4	34
35	.0056	.0048	697	740	.0056	.0048	36.4	37.6	35
36	.0058	.0050	693	736	.0058	.0050	35.6	36.8	36
37	.0059	.0051	689	732	.0060	.0051	34.8	35.9	37
38	.0061	.0053	685	729	.0061	.0053	34.0	35.1	38
39	.0063	.0054	680	725	.0063	.0054	33.2	34.3	39
40	.0065	.0056	676	721	.0065	.0056	32.4	33.5	40
41	.0066	.0057	672	717	.0067	.0057	31.6	32.7	41
42	.0070	.0060	667	713	.0070	.0060	30.8	31.9	42
43	.0072	.0062	663	709	.0072	.0062	30.0	31.1	43
44	.0075	.0065	658	704	.0075	.0065	29.2	30.3	44
45	.0079	.0068	653	700	.0079	.0069	28.5	29.4	45
46	.0082	.0071	648	695	.0082	.0072	27.7	28.6	46
47	.0086	.0075	642	690	.0086	.0075	26.9	27.8	47
48	.0091	.0079	637	685	.0091	.0079	26.1	27.1	

51	.0106	.0093	619	668	.0107	.0093	23.9	24.7	51
52	.0112	.0098	612	662	.0113	.0099	23.1	23.9	52
53	.0119	.0104	605	655	.0120	.0105	22.4	23.2	53
54	.0126	.0110	598	648	.0127	.0111	21.6	22.4	54
55	.0134	.0118	591	641	.0135	.0119	20.9	21.6	55
56	.0143	.0126	583	633	.0144	.0127	20.2	20.9	56
57	.0152	.0134	574	625	.0154	.0135	19.5	20.2	57
58	.0163	.0144	566	617	.0164	.0145	18.7	19.4	58
59	.0174	.0154	556	608	.0175	.0155	18.0	18.7	59
60	.0187	.0166	547	599	.0189	.0167	17.4	18.0	60
61	.0199	.0177	537	589	.0201	.0179	16.7	17.3	61
62	.0215	.0191	526	579	.0217	.0193	16.0	16.6	62
63	.0231	.0207	515	567	.0234	.0209	15.3	15.9	63
64	.0249	.0223	503	556	.0252	.0225	14.7	15.2	64
65	.0268	.0241	490	543	.0272	.0244	14.1	14.6	65
66	.0290	.0261	477	530	.0294	.0265	13.4	13.9	66
67	.0313	.0283	463	516	.0318	.0287	12.8	13.3	67
68	.0339	.0308	449	502	.0345	.0312	12.2	12.6	68
69	.0367	.0334	433	486	.0374	.0340	11.6	12.0	69
70	.0400	.0365	418	470	.0408	.0372	11.1	11.4	70
71	.0434	.0397	401	453	.0443	.0406	10.5	10.8	71
72	.0473	.0435	383	435	.0484	.0445	9.9	10.3	72
73	.0515	.0476	365	416	.0528	.0487	9.4	9.7	73
74	.0561	.0521	347	396	.0577	.0535	8.9	9.2	74
75	.0613	.0572	327	376	.0633	.0589	8.4	8.6	75
76	.0671	.0628	307	354	.0694	.0648	7.9	8.1	76
77	.0734	.0691	286	332	.0762	.0715	7.5	7.6	77
78	.0805	.0761	265	309	.0839	.0791	7.0	7.2	78
79	.0881	.0837	244	285	.0922	.0873	6.6	6.7	79
80	.0967	.0922	223	262	.1016	.0967	6.2	6.3	80
81	.1060	.1016	201	237	.1119	.1071	5.8	5.9	81
82	.1162	.1120	180	213	.1234	.1186	5.4	5.5	82
83	.1274	.1233	159	189	.1360	.1314	5.0	5.1	83
84	.1396	.1358	139	166	.1501	.1457	4.7	4.8	84
85	.1528	.1492	119	144	.1655	.1613	4.4	4.4	85
86	.1672	.1639	101	122	.1825	.1786	4.1	4.1	86
87	.1825	.1796	84	102	.2008	.1973	3.8	3.8	87
88	.1990	.1964	69	84	.2210	.2178	3.5	3.5	88
89	.2166	.2144	55	67	.2429	.2401	3.3	3.3	89
90	.2352	.2334	43	53	.2666	.2642	3.0	3.1	90
91	.2546	.2534	33	41	.2921	.2901	2.8	2.8	91
92	.2756	.2744	25	30	.3196	.3180	2.6	2.6	92
93	.3027	.3018	18	22	.3566	.3554	2.4	2.4	93
94	.3150	.3144	12	15	.3739	.3730	2.2	2.2	94
95	.3448	.3443	9	11	.4166	.4159	2.0	2.0	95
96	.3681	.3678	6	7	.4511	.4506	1.9	1.9	96
97	.3946	.3944	4	4	.4916	.4913	1.6	1.6	97
98	.4216	.4215	2	3	.5342	.5340	1.4	1.4	98
99	.4508	.4508	1	2	.4297	.4296	1.0	1.0	99

TABLE 5.29.B

PARAMETERS MALES -.241 .700 0.000 0.000 FEMALES -.347 .700 0.000 0.000

ABRIDGED MODEL LIFE TABLES COMBINED

AGE	PROBABILITY OF DYING		LIFE TABLE SURVIVORS		AGE-SPECIFIC MORTALITY RATE		EXPECTATION OF LIFE		AGE
	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	
0	.1551	.1291	1000	1000	.1739	.1420	51.9	55.7	0
1	.0653	.0549	845	871	.0171	.0143	60.4	62.9	1
5	.0155	.0131	790	823	.0031	.0026	60.5	62.5	5
10	.0116	.0098	778	812	.0023	.0020	56.4	58.3	10
15	.0192	.0163	769	804	.0039	.0033	52.1	53.8	15
20	.0255	.0217	754	791	.0052	.0044	48.0	49.7	20
25	.0258	.0220	735	774	.0052	.0045	44.2	45.7	25
30	.0265	.0228	716	757	.0054	.0046	40.3	41.7	30
35	.0294	.0253	697	740	.0060	.0051	36.4	37.6	35
40	.0343	.0297	676	721	.0070	.0060	32.4	33.5	40
45	.0426	.0371	653	700	.0087	.0075	28.5	29.4	45
50	.0551	.0483	625	674	.0113	.0099	24.6	25.5	50
55	.0743	.0658	591	641	.0154	.0136	20.9	21.6	55
60	.1035	.0927	547	599	.0218	.0194	17.4	18.0	60
65	.1482	.1348	490	543	.0319	.0288	14.1	14.6	65
70	.2166	.2010	418	470	.0484	.0445	11.1	11.4	70
75	.3196	.3036	327	376	.0759	.0713	8.4	8.6	75
80	.4641	.4513	223	262	.1216	.1170	6.2	6.3	80
85	.6381	.6316	119	144	.1950	.1915	4.4	4.4	85
90	.8028	.8012	43	53	.3048	.3031	3.0	3.1	90
95	.9204	.9202	9	11	.4502	.4497	2.0	2.0	95

CHAPTER 6

METHODOLOGY AND RESULTS: HEALTH AND FAMILY PLANNING

6.1 INTRODUCTION

This chapter examines the evidence bearing on the hypothesis that there are sex-differentials in health care and low levels of family planning, to the disadvantage of females, in the study population. The quality of the data which served as the basis for this study was first assessed, and the statistical test applied to it was outlined. Finally, the results were discussed in conjunction with evidence from other sources and the hypothesis was tested for its validity.

6.2 QUALITY OF DATA

The appraisal of the data involved assessment of diagnostic accuracy of illnesses and the completeness of reports on health and family planning.

6.2.1 Diagnostic accuracy

The health data collected in this study was not tested for diagnostic accuracy by direct evidence; it was therefore necessary to rely on broad impressions. It is well known that even among literate populations, it is difficult to obtain accurate symptoms of illnesses.[1] Therefore, the errors of reporting of illnesses will be even greater among rural illiterate populations.

The study was not staffed by any medical personnel, and all interviewers were lay. Therefore, interviewers had to rely entirely on the reports of the respondents on their illnesses. This apparent disadvantage eliminated any bias of influencing the responses medically. Furthermore, the purpose was not to study the distribution of disease among the population, but the sex-differential behaviour in responses to illnesses. As a result, it was not necessary to establish accurate medical diagnosis. It is, however, important to underline that the reports about male illnesses are likely to have been more accurate than reports on female illnesses, in terms of diagnosis, because males are treated more often than females by trained medical staff.

6.2.2 Accuracy of reports

The accuracy of reports depends on several factors;[2] the most important of these are the recall period; and the knowledge the respondent has about the question asked and his willingness to provide the information.

A. Recall period

As in the case of demographic surveys, questions on health which refer to a specific time period are subject to several errors. Among these are dating errors, where illnesses which took place during the reference period are excluded because they were thought to have occurred before the reference period, or illnesses which took place before the period are erroneously included; recall lapse, where illnesses are omitted because of genuine memory errors or a deliberate attempt to withhold information.

It has been shown that the errors of under-reporting and over-reporting increase with the increase of the time that has elapsed between the illness and the interview, i.e. when a longer time period has been selected prior to the interview.[3] In the light of this knowledge, it would have been advisable to take a reference period of one month, instead of one year, prior to the interview to obtain more accurate data. However, the requirements of the study made it necessary to choose a longer reference period, in order to avoid the low incidence of events inherent in a shorter period. There is no reason to suppose that there was a sex-differential bias introduced by the under-reporting or over-reporting of illnesses and their outcome. Therefore, the length of the recall period would not significantly affect the quality of the data and the results derived from it.

The memory errors related to the use of family planning would have been very small, because the information requested related to the time of the interview.

B. Respondents

The majority of respondents were heads of households, and although it is preferable to obtain information directly from the person concerned, this was not possible for several reasons stated elsewhere (Chapt. 4, Sec. 4.4.3.C). The method of obtaining information from the head could have created a sex-differential bias in the reporting of illnesses and their outcome, but it is doubtful in a society where the head of the household has complete control of all the actions of the members of his family. This means that not only do wives have to obtain permission from their husbands if they or their children leave the house to seek treatment, but also, in some cases, the husband accompanies the wife or visits the doctor on her behalf. Therefore, he would be aware of all the information on illness, outcome and cost of treatment regarding the members of his household, except in cases where the wife has not reported an illness, because she has treated it herself or received no treatment. This would result in some under-reporting of the outcome of female illness episodes where there has been no treatment or self treatment for illnesses.

With regard to use of family planning, the results could be underestimated if the wife is practising family planning without the knowledge of her husband. However, in the study population such an occurrence would be very rare and as a result would not significantly affect the data.

Another factor which could influence the accuracy of the respondent's reports is the interviewer's sex. It could be argued that heads of households would be hesitant to give accurate answers to sensitive questions, regarding their wives, to male interviewers, i.e. they would deliberately withhold information. There is no reason to believe that this occurred with questions related to health. In the case of family planning this possibility cannot be ruled out conclusively. However, it is unlikely that any significant omissions occurred because of a deliberate attempt to withhold information in a society where family planning is largely associated with health, and in the majority of cases men showed no hesitation in providing information on the female illnesses of their wives.

6.3 STATISTICAL TEST

To carry out statistical tests a non-parametric technique, the Chi-square significance test was used. This was because the population was not assumed to be distributed in any particular manner; the figures in some of the cells was very small; and above all the significance of the differences observed was being tested (Armitage, 1971, p. 363 and p. 394).

The χ^2 tests were carried out using 2 x k tables. The level of significance was set at 5%, but significant levels of 1% and 0.1% were stated when they occurred. The degrees of freedom which determined the probability of the significance of a χ^2 result was dependent on the rows and columns. The columns represented the sexes and the rows, according to what was being tested, the choice of treatment, age, cost etc.

The Null Hypothesis that the sexes do not differ among themselves was tested by means of the equation:

$$\chi^2 = \sum_{ij}^{rk} \frac{(O_{ij}-E_{ij})^2}{E_{ij}}.$$

where O_{ij} is the observed number of cases in the ith column of the jth row; E_{ij} is the expected number of cases for that column and row; $\sum_{ij}^{rk}$ is the total of the rows and columns; (r-1)(k-1) are the degrees of freedom which determine the point of entry into the relevant χ^2 probability tables.[4]

The probability associated with the values calculated of χ^2 determined the level at which the difference was significant or not significant (Ibid., pp. 362-367).

In the analysis broader age groups, representing infants, young children, children, young adults, adults and older persons, were used. Sometimes the first two age groups were combined for convenience.

6.4 HEALTH ANALYSIS

Sex-differential health was studied in terms of the respondents' illness episodes, the treatment sought for the illnesses, the distribution of the disease categories, the treatment sought for the different disease categories, the cost of health care, the prevalence of tuberculosis, and the immunization status.

6.4.1 Illness episodes

In a population of 14062 persons, a total of 12060 persons reported illness episodes during the one year period prior to the date of interview. In other words, 85.8% of the total population had suffered from some form of illness including minor complaints, but excluding those where the nature of the illness was not known.

The analysis of the illnesses as a percentageof the total percentage of the population in each age group showed that at all ages above 70% of the population had been ill (Table 6.1). Respondents in the age group 5-14 reported 29.9% of the total illnesses. The sex ratio of the illnesses was 1.06, which was lower than the sex ratio of 1.08 of the enumerated population. The outstanding feature was the masculinity of the sex ratio at all ages, except the age group 1-4 and 15-29(Table 6.2).

6.4.2 Treatment for illness

The choice of treatment did not take into account a combination of treatments for the same illness; only the major treatment was recorded.

A. Treatment by sex

The figures showed that 94.3% of all illnesses were treated by Western medicine: 52.4% of these alone was treatment by compounders, who usually only provide medicines; doctors treated 29.1% of the cases; and hospitals 8.1%. Only 0.7% of all patients resorted to traditional treatment; 0.2% sought treatment by visiting holy shrines;

TABLE 6. 1

Illness episodes by Age and Sex as percentage of total population in the age group by sex

Age	MALES	FEMALES	TOTAL
-1	330 (70.0)	302 (63.3)	632 (66.6)
1-4	660 (85.6)	686 (84.9)	1346 (85.2)
5-14	1975 (85.8)	1638 (84.2)	3613 (85.1)
15-29	1334 (80.8)	1302 (87.6)	2636 (84.1)
30-44	878 (87.8)	954 (93.5)	1832 (90.7)
45+	1038 (92.7)	963 (95.2)	2001 (93.8)
TOTAL	6215 (84.9)	5845 (86.6)	12060 (85.8)

Table 6.9

Age and Sex Distribution of Persons with Illness Episodes as a percentage of the total population of each sex

Age Group	Males	Females	Total	Masculinity Ratio
-1	330 (5.3)	302 (5.2)	632 (5.2)	1.09
1-4	660 (10.6)	686 (11.7)	1346 (11.2)	0.96
5-14	1975 (31.8)	1638 (28.0)	3613 (29.9)	1.20
15-29	1334 (21.5)	1302 (22.3)	2636 (21.9)	1.02
30-44	878 (14.1)	954 (16.3)	1832 (15.2)	.92
45+	1038 (16.7)	963 (16.5)	2001 (16.6)	1.08
TOTAL	6215 (100)	5845 (100)	12060 (100)	1.06

* Excluding those who stated Don't Know or Don't Remember

and 3.2% received no treatment.

The total sex ratio of illnesses was 1.06. A closer analysis of the sex ratios showed a male preponderance of 2.01 for treatments by hospitals; of 1.21 for treatment by doctors; and of 1.49 and 1.42 for treatment by indigenious practitioners and visits to shrines. Females, on the other hand, exceeded males in treatment by compounders, health centres and above all by not receiving any treatment, where the sex ratio was 0.20 (Table 6.3).

A χ^2 test was carried out to determine whether the sex-differentials observed in the choice of treatment were statistically significant. The χ^2 result showed the $P < .001$. The difference was significant at the 0.1% level (Table 6.4).

B. Treatment by age and sex

The choice of treatment by age showed that in all age groups the treatment by the compounder was the highest, and the lowest was treatment by visits to shrines. In the age groups 15-29 and over, the treatment by compounders was followed by treatment by doctors and hospitals; whereas in the two youngest age groups of 0-4 and 5-14, treatment by doctors was more common than treatment at health centres and no treatment was more common than treatment by hospitals (Table 6.5).

The sex ratios for choice of treatment by age groups showed that more males than females were treated by doctors or by hospitals, except for treatment by doctors for the age group 30-44, where the ratio was 0.96. The greatest sex-differential was in

Table 6.3

Outcome of Illness Episodes: Choice of Treatment by Sex
(% in brackets)

Treatment	Males	Females	Total	Sex ratios.
Doctor	1926 (16.0)	1588 (13.1)	3514 (29.1)	1.21
Compounder	3152 (26.1)	3175 (26.3)	6327 (52.4)	0.99
Hospital	650 (5.4)	322 (2.7)	972 (8.1)	2.01
Health Centre	264 (2.2)	297 (2.5)	561 (4.7)	0.89
Traditional	52 (0.4)	35 (0.3)	87 (0.7)	1.49
Ziarat	10 (0.1)	7 (0.1)	17 (0.2)	1.42
Self	16 (0.1)	16 (0.1)	32 (0.2)	1.00
No.	61 (0.5)	320 (2.7)	381 (3.2)	0.20
D.R.	84 (0.7)	85 (0.7)	169 (1.4)	0.99
Total.	6215 (51.5)	5845 (48.5)	12060 (100)	1.06

Table: 6.4.

TEST OF SIGNIFICANCE FOR OUTCOME OF ILLNESS EPISODE BY SEX

Treatment	MALES	FEMALES	TOTALS
Doctor	1926	1588	3514
Compounder	3152	3175	6327
Hospital	650	322	972
Health Centre	264	297	561
Traditional	52	35	87
Ziarat	10	7	17
Self	16	16	32
No treatment	61	320	381
Other	84	85	169
TOTAL	6215	5845	12060

$\chi^2 = 314.0839$

Degrees of freedom = 8.0000

$P < .001$, significant.

There is a statistically significant sex difference in treatment at ·1% level.

TABLE 6.5

Choice of Treatment by Age groups
(Percentages in brackets)

Treatment	10-4 M	10-4 F	10-4 Total	5-14 M	5-14 F	5-14 Total	15-29 M	15-29 F	15-29 Total	30-44 M	30-44 F	30-44 Total	45+ M	45+ F	45+ Total
Doctor	242 (12.0)	200 (9.9)	21.9	497 (13.5)	312 (8.5)	22.0	414 (15.1)	397 (14.5)	29.6	330 (17.5)	342 (18.2)	35.7	443 (21.8)	337 (16.6)	38.4
Compounder	614 (30.5)	625 (31.0)	61.5	1149 (31.3)	1011 (27.5)	58.8	644 (23.5)	658 (24.0)	47.5	347 (18.4)	449 (23.9)	42.3	398 (19.6)	432 (21.3)	40.9
Hospital	39 (1.9)	15 (0.7)	2.6	112 (3.1)	51 (1.4)	4.5	219 (8.0)	92 (3.4)	11.4	159 (8.5)	80 (4.3)	12.8	121 (6.0)	84 (4.1)	10.1
Health Centre	42 (2.0)	52 (2.5)	4.5	94 (2.5)	93 (2.5)	5.0	65 (2.4)	63 (2.2)	4.6	32 (1.7)	36 (1.9)	3.6	31 (1.5)	53 (2.6)	3.1
Traditional	6 (0.3)	3 (0.2)	0.5	11 (0.3)	4 (0.1)	0.4	6 (2.2)	5 (0.2)	2.4	11 (0.6)	12 (0.6)	1.2	18 (0.9)	11 (0.5)	1.4
Ziarat	0 (0.0)	1 (0.1)	0.1	3 (0.1)	1 (0.0)	0.1	3 (0.1)	1 (0.0)	0.1	2 (0.1)	2 (0.1)	0.2	2 (0.1)	2 (0.1)	0.2
Self	3 (0.2)	1 (0.1)	0.3	4 (0.1)	7 (0.2)	0.3	5 (0.2)	2 (0.1)	0.3	1 (0.1)	3 (0.2)	0.3	3 (0.2)	3 (0.2)	0.4
No Treatment	44 (2.2)	92 (4.6)	6.6	114 (3.1)	156 (4.3)	7.4	50 (1.9)	83 (3.0)	4.8	23 (1.2)	31 (1.6)	2.8	29 (1.4)	41 (2.0)	3.4
Don't Know	21 (1.0)	16 (0.8)	1.8	17 (0.5)	36 (1.0)	1.5	24 (0.9)	15 (0.5)	1.4	11 (0.6)	9 (0.5)	1.1	11 (0.5)	9 (0.4)	0.9
TOTAL	1011 (50.1)	1005 (49.9)	100	2001 (54.5)	1671 (45.5)	100	1430 (52.1)	1316 (47.9)	100	916 (48.7)	964 (51.3)	100	1056 (52.0)	972 (48.0)	100
	2016 (100)			3672 (100)			2746 (100)			1880 (100)			2028 (100)		

* Including those who stated Illness not known.

the age groups 0-4 and 5-14, where the masculinity of the ratio for treatment by hospital was 2.60 and 2.20 respectively. At all ages the ratio was lower for males relative to females for treatment by compounders. Males were also in preponderance for treatment by traditional medicine, except for the age group 30-44, where the ratio was 0.9. The sex-differential for no treatments received for illnesses was to the disadvantage of females especially in the age group 0-4, where the ratio was 0.48 (Table 6.6).

Tests of significance were carried out to see if there were significant sex differences within each age group for use of treatments. The results were as follows:

Age group	χ^2	DF	P	Significance
0-4	36.4172	8	<0.001	significant
5-14	63.2389	8	<0.001	significant
15-29	60.4128	8	<0.001	significant
30-44	40.8627	3	<0.001	significant
45+	28.7547	8	<0.001	significant

The results showed that there was a very significant difference in the choice of treatment within the age groups (Table 6.7).

TABLE 6.6

Sex Ratios by Type of Treatment

Treatment	Sex Ratios 0-4	5-14	15-29	30-44	45+
DOCTOR	1.21	1.59	1.04	0.96	1.31
Compounder	0.98	1.14	0.98	0.77	0.92
HOSPITAL	2.60	2.20	2.38	2.00	1.44
HEALTH CENTRE	0.80	1.01	1.03	0.89	0.58
TRADITIONAL	2.00	2.75	1.20	0.91	1.64
ZIARAT	—	3.00	3.00	1.00	1.00
SELF	3.00	0.57	2.50	0.33	1.00
No Treatment	0.48	0.73	0.60	0.74	0.70
Don't Know	1.31	0.47	1.60	1.22	1.22
TOTAL	1.00	1.20	1.09	1.00	1.09

Table : 6.7.

Test of Significance for Treatment of Illness by age groups
(including dont remember)

Treatment	0-4 M	0-4 F	5-14 M	5-14 F	15-29 M	15-29 F	30-44 M	30-44 F	45+ M	45+ F
Doctor	242	200	497	312	414	397	330	342	443	337
Compounder	614	625	1149	1011	644	658	347	449	398	432
Hospital	39	15	112	51	219	92	159	80	121	84
Health Centre	42	52	94	93	65	63	32	36	31	53
Traditional	6	3	11	4	6	5	11	12	18	11
Ziarat	0	1	3	1	3	1	2	2	2	2
Self	3	1	4	7	5	2	1	3	3	3
No treatment	44	92	114	156	50	83	23	31	29	41
Don't Know	21	16	17	36	24	15	11	9	11	9
TOTALS	1011	1005	2001	1671	1430	1316	916	964	1056	972
	2016		3672		2746		1880		2028	
χ^2	$\chi^2 = 36.4172$		$\chi^2 = 63.2389$		$\chi^2 = 60.4128$		$\chi^2 = 40.8627$		$\chi^2 = 28.7547$	
DF	DF = 8.0000		DF = 8.0000		DF = 8.0000		DF = 8.0000		DF = 8.0000	
P	$P < .001$, significant		$P < .001$, significant		$P < .001$ significant		$P < .001$ significant		$P < .001$ significant	

Table 6.8

Test of of Significance for Choice of Treatment By Sex and Age of Respondent

	Doctor		Compounder		Health Centre		Hospital		Traditional		Ziarat		Self		No Treatment		Other	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0-4	242	200	614	625	42	52	39	15	6	3	0	1	3	1	44	92	21	6
5-14	497	312	1149	1011	94	93	112	51	11	4	3	1	4	7	114	156	17	36
15-29	414	397	644	658	65	63	219	92	6	5	3	1	5	2	50	83	24	15
30-44	330	342	347	449	32	36	159	80	11	12	2	2	1	3	23	31	11	9
45+	443	337	398	432	31	53	121	84	18	11	2	2	3	3	29	41	11	9
TOTAL	1926	1588	3152	3175	264	297	650	322	52	35	10	7	16	16	260	403	84	85
	$\chi^2 = 29.0295$ DF = 4.0000 $P < 0.001$, Significant at .1% level		$\chi^2 = 23.4447$ DF = 4.0000 $P < 0.001$, significant at .1% level		$\chi^2 = 5.1744$ DF = 4.0000 $P > 0.05$, not significant at 5% level		$\chi^2 = 8.4237$ DF = 40000 $P > 0.05$, not significant at 5% level		$\chi^2 = 2.8788$ DF = 4.0000 $P > 0.05$, not significant at 5% level		$\chi^2 = 2.5500$ DF = 4.0000 $P > 0.05$, not significant at 5% level		$\chi^2 = 4.1036$ DF = 4.0000 $P > 0.05$, not significant at 5% level		$\chi^2 = 4.2598$ DF = 4.0000 $P > 0.05$, not significant at 5% level		$\chi^2 = 9.9579$ DF = 4.0000 $P < 0.05$, significant at 5% level	

Tests of significance were also carried out for each treatment choice by age and sex. The χ^2 results showed a significant difference by age and sex at the 0.1% level for treatment by doctors and compounders. The sex and age differences for all other forms of treatment, which included treatment by hospital, health centre, traditional medicine, visits to shrines and no treatment for illnesses, were not significant at the 5% level.

6.4.3 Disease categories

The different diseases reported by the respondents were classified according to the diagnostic categories listed in the 1965 International Classification of Diseases of the World Health Organization.[5]

A. Distribution of diseases

By this classification twelve major categories were identifiable. The largest group of 44.9% of the total was attributable to the respiratory system. In this category acute respiratory infections accounted for 40.0%. The next largest group of 31.2%, of which malaria alone accounted for 21.2%, was due to infective and parasitic diseases. Diseases of the digestive system constituted 4.6% of the total, followed by 3.2 % due to accidents and violence etc., and 2.3% due to diseases of the nervous system.

Other diseases recorded with lesser frequencies were due to: 1.9% to the genito-urinary system; 1.5% to the circulatory system; 1.5% to the skin and subcutaneous tissue; 1.5% to the musculoskeletal system; 1.2% to complications of pregnancy. Uncategorized miscellaneous conditions accounted for 3.3%, and illnesses that were not known constituted 2.3% (Table 6.9).

TABLE 6.9

DISTRIBUTION OF THE MAIN DISEASES

DISEASE	WHO Code	CASES MALES	CASES FEMALES	CASES TOTAL	PERCENTAGES OF TOTAL MALES	PERCENTAGES OF TOTAL FEMALES	PERCENTAGES OF TOTAL POPULATION
1. INFECTIVE AND PARASITIC DISEASES	000-136	2083	1767	3850	32.5	29.8	31.2
Intestinal infectious diseases	000-009						
Cholera (000)		36	14	50	0.6	0.2	0.4
Typhoid fever (001)		295	170	465	4.5	2.9	3.8
Diarrhoea and vomiting (009)		215	155	370	3.3	2.6	2.9
Tuberculosis	010-019						
Pulmonary tuberculosis (011)		50	55	105	0.8	0.9	0.9
Poliomyelitis and other enterovirus diseases of the nervous system	040-046	42	39	81	0.7	0.7	0.7
Viral diseases with exanthum	050-057						
Smallpox (050)		4	6	10	0.1	0.1	0.1
Other Viral diseases	070-079						
Infectious hepatitis (070)		63	37	100	1.0	0.6	0.8
Rickettsioses and other anthropod-borne diseases	080-089						
Malaria (084)		1345	1277	2622	21.0	21.5	$\boxed{21.2}$
Helminthiases	120-129						
Intestinal parasitism, unspecified (129)		33	14	47	0.5	0.2	0.4
2. NEOPLASMS	140-239	7	9	16	0.1	0.2	0.1
3. MENTAL DISORDERS	290-315	38	14	52	0.6	0.2	0.4

Disease	WHO Code	Cases Males	Cases Females	Cases Total	Percentages Males	Percentages Females	Percentages Population
4. Diseases of the Nervous System and Sense Organs	320 – 389	172	119	291	2.7	2.0	2.3
Other diseases of the central nervous system	340 – 349						
Epilepsy (345)		7	7	14	0.1	0.1	0.1
Diseases of the eye and ear	360 – 389	165	112	277	2.6	1.9	2.2
5. Diseases of the Circulatory System	390 – 458	71	111	182	1.1	1.9	1.5
Hypertensive, Ischaemic and other forms of heart disease	400 – 429	62	108	170	1.0	1.8	1.4
Diseases of veins and lymphatics and other diseases of the circulatory system	450 – 458						
Haemorrhoids (455)		9	3	12	0.1	0.1	0.1
6. Diseases of the Respiratory System	460 – 519	2811	2735	5546	43.8	46.1	44.9
Acute respiratory infections (except influenza)	460 – 466	2460	2474	4935	38.4	41.7	40.0
Pneumonia	480 – 486	292	217	509	4.6	3.7	4.1
Bronchitis, emphysema and asthma	490 – 493						
Asthma (493)		59	44	103	0.9	0.7	0.8
7. Diseases of the Digestive System	520 – 577	353	219	572	5.5	3.7	4.6
Diseases of oesophagus, stomach, duodenum, appendicitis and other organs of the stomach	530 – 577	353	219	572	5.5	3.7	4.6

DISEASE	WHO CODE	CASES			PERCENTAGES		
		MALES	FEMALES	TOTAL	MALES	FEMALES	Population
8. DISEASES OF GENITO-URINARY system	580-629	27	209	236	0.4	3.5	1.9
Nephritis, nephrosis and other diseases of the urinary system	590-607	27	12	38	0.4	0.2	0.3
Diseases of the uterus and other female genital organs	620-629	–	197	197	–	3.3	1.6
9. COMPLICATIONS OF PREGNANCY, CHILDBIRTH AND THE PUERPERIUM	630-678	–	143	143	–	2.4	1.2
10. DISEASES OF THE SKIN AND SUBCUTANEOUS TISSUE	680-709	104	75	179	1.6	1.3	1.5
11. DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE	710-738	94	95	189	1.5	1.6	1.5
Arthritis and rheumatism, except rheumatic fever	710-718	94	95	189	1.5	1.6	1.5
12. ACCIDENTS, POISONINGS AND VIOLENCE	800-999	253	136	389	4.0	2.3	3.2
Accidents: falls, fires, natural and environmental conditions, others	880-929	147	69	216	2.3	1.2	1.8
Surgical and medical complications	930-936	62	56	118	1.0	0.9	1.0
Wounds from injury inflicted by others	960-969	44	11	55	0.7	0.2	0.4
13. OTHER MISCELLANEOUS CONDITIONS		202	213	415	3.1	3.6	3.3
UNDEFINED FEVER		16	25	41	0.2	0.4	0.3
OTHER UNDEFINED ILLNESS		107	114	221	1.7	2.0	1.8
UNDEFINED MINOR COMPLAINTS		79	74	153	1.2	1.2	1.2
14. ILLNESS NOT REMEMBERED OR NOT KNOWN		199	83	282	3.1	1.4	2.3
TOTAL		6414	5928	12342	100	100	99.9

Source: WHO, *International Classification of Diseases* (8th Revision, Geneva: WHO, 1965), pp. 3-39.

B. Sex distribution of diseases

The sex distribution of the main disease categories showed that there was a masculinity in the ratios for all diseases, except neoplasms, diseases of the circulatory system and of the genito-urinary system, where the ratios were 0.77,0.64 and 0.03 respectively. The greatest difference recorded to the disadvantage of males was for mental disorders and illnesses due to violence and accidents, where the ratios were 2.71 and 1.86 respectively (Table 6.10).

The sex differences in the diseases were statistically significant at the 0.1% level (Table 6.11).

6.4.4 Treatment for major diseases

The analysis of the eleven major disease categories, excluding complications of pregnancy which are relevant to females alone, showed that in the case of respiratory and infectious and parasitic diseases treatment by compounders was sought in 58.9% and 60.5% of the cases and exceeded treatment by doctors or any other form of treatment. Treatment at health centres which accounted for 5.1% and 3.5% of cases exceeded treatment at hospitals. No treatment constituted 7.4% and 2.4% of the total cases. The treatment was reversed in the case of the other disease categories and showed that more cases were treated by doctors than compounders, and more by hospitals than health centres (Table 6.12.A; 6.12.B).

The sex ratios recorded a masculinity for treatment by doctors for all the disease categories, with the

Table 6.10

Sex Ratio of the Main Disease Categories

Disease	Males	Females	Sex Ratio
1. Infective and Parasitic Diseases	2083	1767	1.17
2. Neoplasms	7	9	0.77
3. Mental Disorders	38	14	2.71
4. Diseases of the Nervous System	172	119	1.45
5. Diseases of the Circulatory System	71	111	0.64
6. Diseases of the Respiratory System	2811	2735	1.03
7. Diseases of the Digestive System	353	219	1.61
8. Diseases of the Genito-Urinary System	27	209	0.03
9. Diseases of the Skin	104	75	1.40
10. Musculoskeletal Diseases	94	95	1.00
11. Accidents and Violence	253	136	1.86
TOTAL	6013	5489	1.09

TABLE 6.11

Test of Significance for Distribution of Disease by Sex.

DISEASES	Males	Females	TOTAL
Infective and Parasitic	2083	1767	3850
Neoplasms	7	9	16
Mental Disorders	38	14	52
Nervous System and Sense Organs	172	119	291
Circulatory System	71	111	182
Respiratory System	2812	2735	5547
Digestive System	353	219	572
Genito-Urinary System	26	12	38
Skin and Subcutaneous tissue	104	75	179
Musculoskeletal system and Connective tissue	94	95	189
Accidents, poisonings and violence	253	136	389
TOTAL	6013	5292	11305

Excluding female illnesses and miscellaneous conditions

$\chi^2 = 87.5913$

DF = 10.0000, significant. P < .001

Table 6.12.A

Choice of Treatment for Different Disease Categories
(Percentages in brackets)

Treatment	Respiratory Diseases M	Respiratory Diseases F	Infectious Diseases M	Infectious Diseases F	Digestive Diseases M	Digestive Diseases F	Accidents + Violence M	Accidents + Violence F	Diseases of Nervous System M	Diseases of Nervous System F	Mental Disorders M	Mental Disorders F
Doctor	723 (13.0)	595 (10.7)	636 (16.5)	434 (11.3)	150 (26.2)	93 (16.3)	71 (20.0)	31 (8.8)	65 (22.3)	41 (14.1)	19 (36.5)	4 (7.7)
Compounder	1636 (29.5)	1630 (29.4)	1199 (31.1)	1132 (29.4)	93 (16.3)	71 (12.4)	40 (11.3)	27 (7.6)	44 (15.1)	36 (12.4)	2 (3.9)	2 (3.9)
Hospital	145 (2.6)	37 (0.7)	135 (3.5)	50 (1.3)	72 (12.6)	39 (6.8)	107 (30.2)	43 (12.2)	43 (14.8)	21 (7.2)	7 (13.9)	6 (11.5)
Health Centre	121 (2.2)	163 (2.9)	63 (1.6)	72 (1.9)	18 (3.2)	8 (1.4)	11 (3.1)	9 (2.5)	9 (3.1)	10 (3.4)	2 (3.9)	1 (1.9)
Traditional	12 (0.2)	13 (0.2)	12 (0.3)	5 (0.1)	8 (1.4)	1 (0.2)	2 (0.6)	2 (0.6)	2 (0.7)	2 (0.7)	3 (5.7)	0 (0.0)
Ziarat	1 (0.01)	1 (0.01)	0 (0.0)	1 (0.02)	–	–	2 (0.6)	0 (0.0)	1 (0.3)	1 (0.3)	1 (1.9)	0 (0.0)
Self	4 (0.2)	6 (0.1)	3 (0.1)	4 (0.1)	2 (0.3)	2 (0.3)	1 (0.3)	0 (0.0)	6 (2.1)	7 (2.4)	2 (3.9)	0 (0.0)
No treatment	150 (2.7)	258 (4.7)	29 (0.8)	60 (1.6)	8 (1.4)	5 (0.9)	4 (1.1)	4 (1.1)	2 (0.7)	1 (0.3)	2 (3.9)	1 (1.9)
Other	19 (0.3)	32 (0.6)	6 (0.2)	9 (0.2)	2 (0.3)	0 (0.0)	–	–	–	–	–	–
Total	2811 (50.7)	2735 (49.3)	2083 (54.1)	1767 (45.9)	353 (61.7)	219 (38.3)	238 (67.2)	116 (32.8)	172 (59.1)	119 (40.8)	38 (73.1)	14 (26.9)
	5546 (100)		3850 (100)		572 (100)		354 (100)		291 (100)		52	

Table 6.12.B.

Choice of Treatment for Different Disease Categories (Percentages in brackets)

Treatment	Genito-Urinary Diseases M	Genito-Urinary Diseases F	Circulatory Diseases M	Circulatory Diseases F	Skin Diseases M	Skin Diseases F	Musculoskeletal Diseases M	Musculoskeletal Diseases F	Cancer M	Cancer F
Doctor	10 (4.2)	115 (48.7)	45 (24.7)	62 (34.1)	40 (22.3)	21 (11.7)	43 (22.8)	52 (27.5)	5 (31.3)	1 (6.2)
Compounder	5 (2.1)	53 (22.5)	15 (8.2)	24 (13.2)	36 (20.1)	45 (25.1)	27 (14.3)	27 (14.3)	0 (0.0)	2 (12.5)
Hospital	10 (4.2)	35 (14.8)	6 (3.3)	16 (8.8)	18 (10.1)	4 (2.2)	14 (7.4)	9 (4.8)	2 (12.5)	3 (18.8)
Health Centre	0 (0.0)	2 (0.9)	2 (1.1)	4 (2.2)	3 (1.7)	2 (1.1)	5 (2.6)	2 (1.1)	–	–
Traditional	2 (0.9)	1 (0.4)	3 (1.7)	3 (1.7)	1 (0.6)	2 (1.1)	1 (0.5)	1 (0.5)	–	–
Ziarat	–	–	–	–	2 (1.1)	0 (0.0)	0	1 (0.5)	0 (0.0)	2 (12.5)
Self	–	–	–	–	–	–	–	–	–	–
No treatment	0 (0.0)	1 (0.4)	0 (0.0)	1 (0.5)	4 (2.2)	1 (0.6)	4 (2.1)	3 (1.6)	0 (0.0)	1 (6.2)
Other	0 (0.0)	2 (0.9)	0 (0.0)	1 (0.5)	–	–	–	–	–	–
Total	27 (11.4)	209 (88.6)	71 (39.0)	111 (61.0)	104 (58.1)	75 (41.8)	94 (49.7)	95 (50.3)	7 (43.8)	9 (56.2)
	236 (100)		182 (100)		179 (100)		189 (100)		16	

exception of treatment for genito-urinary complaints, circulatory and musculoskeletal diseases where the ratio was 0.09, 0.73 and 0.82. In the case of treatment by compounders the masculinity ratio was low or close to unity except in the case of digestive diseases, accidents and violence and diseases of the nervous system, where the ratios were 1.30, 1.48 and 1.22.

For treatment by hospitals the ratios were high in all cases except for the genito-urinary and circulatory diseases which showed ratios of 0.29 and 0.38. Health centres showed the lowest ratio of 0.50 for treatment of circulatory diseases and the highest of 2.5 for treatment of the musculoskeletal complaints. In the case of traditional treatment the highest ratio of 2.40 was for infectious and parasitic diseases and the lowest 0.50 for skin complaints. In the case of no treatment low ratios of 0.58 and 0.48 were recorded for the respiratory and infectious diseases and high ratios for all other diseases (Table 6.13.A; 6.13.B).

Statistical tests were carried out to determine whether the differences observed in treatment by sex were significant. The χ^2 results showed that in the case of the respiratory and infectious diseases the $P < .001$, i.e. the difference was significant at the 0.1% level; in the case of the genito-urinary and the skin diseases the $P < .05$, i.e. the difference was significant at the 5% level; and in the treatment for other diseases the difference by sex was not significant at the 5% level (Table 6.14.A; 6.14.B).

Table 6.13.A

Sex Ratio for Choice of Treatment for Different Disease Categories

Sex Ratio

Treatment	Respiratory Diseases	Infectious Diseases	Digestive Diseases	Accident + Violence	Disease of the Nervous System	Mental Diseases
Doctor	1.22	1.47	1.61	2.29	1.59	4.75
Compounder	1.00	1.06	1.30	1.48	1.22	1.00
Hospital	3.91	2.70	1.84	2.49	2.04	1.17
Health Centre	0.74	0.88	2.25	1.22	0.90	2.00
Traditional	0.92	2.40	8.00	1.00	1.00	—
Ziarat	1.00	0.00	—	—	1.00	—
Self	0.66	0.75	1.00	—	0.86	—
No treatment	0.58	0.48	1.60	1.00	2.0	2.00
Other	0.59	0.67	—	—	—	—
Total	1.03	1.18	1.60	2.05	1.45	2.71

Table 6.13.B.

Sex Ratio for Choice of Treatment for Different Disease Categories

Sex Ratio

Treatment	Genito-Urinary Diseases	Circulatory Diseases	Skin Diseases	Musculoskeletal Diseases	Cancer
Doctor	0.09	0.73	1.90	0.82	5.00
Compounder	0.09	0.63	0.80	1.00	0.00
Hospital	0.29	0.38	4.50	1.56	0.67
Health Centre	–	0.50	1.50	2.50	–
Traditional	2.00	1.00	0.50	1.00	–
Ziarat	–	–	–	0.0	0.0
Self	–	–	–	–	–
No treatment	0.0	0.0	4.0	1.33	0.0
Other	0.0	0.0	–	–	–
Total	0.13	0.64	1.39	0.99	0.78

Table 6.14.A

Test of Significance for Choice of Treatment, by Sex for Different Disease Categories

Treatment	Respiratory Diseases M	Respiratory Diseases F	Infectious Diseases M	Infectious Diseases F	Digestive Diseases M	Digestive Diseases F	Accidents + Violence M	Accidents + Violence F	Diseases of Nervous System M	Diseases of Nervous System F	Mental Diseases M	Mental Diseases F
Doctor	723	595	636	434	150	93	71	31	65	41	19	4
Compounder	1636	1630	1199	1132	93	71	40	27	44	36	2	2
Hospital	145	37	135	50	72	39	107	43	43	21	7	6
Health Centre	121	163	63	72	18	8	11	9	9	10	2	1
Traditional	12	13	12	5	8	1	2	2	2	2	3	0
Ziarat	1	1	0	1	—	—	2	0	1	1	1	0
Self	4	6	3	4	2	2	1	0	6	7	2	0
No treatment	150	258	29	60	8	5	4	4	2	1	2	1
Other	19	32	6	9	2	0	—	—	—	—	—	—
Total	2811	2735	2083	1767	353	219	238	116	172	119	38	14
	$\chi^2 = 114.0619$ DF = 8.0000 $P < 0.001$ Significant at .1% level		$\chi^2 = 69.6691$ DF = 8.0000 $P < 0.001$ Significant at 1% level		$\chi^2 = 7.1130$ DF = 7.0000 $P > 0.05$ not significant at 5% level		$\chi^2 = 7.5680$ DF = 7.000 $P > 0.05$ not significant at 5% level		$\chi^2 = 4.7634$ DF = 7.0000 $P > 0.05$ not significant at 5% level		$\chi^2 = 6.9234$ DF = 7.0000 $P > 0.05$ not significant at 5% level	

Table 6.14.B

Test of Significance for Choice of Treatment, by Sex for Different Disease Categories.

Treatment	Genito-Urinary Diseases M	Genito-Urinary Diseases F	Circulatory Diseases M	Circulatory Diseases F	Skin Diseases M	Skin Diseases F	Musculoskeletal Diseases M	Musculoskeletal Diseases F	Cancer M	Cancer F
Doctor	10	115	45	62	40	21	43	52	5	1
Compounder	5	53	15	24	36	45	27	27	0	2
Hospital	10	35	6	16	18	4	14	9	2	3
Health Centre	0	2	2	4	3	2	5	2	–	–
Traditional	2	1	3	3	1	2	1	1	–	–
Ziarat	–	–	–	–	2	0	0	1	0	2
Self	–	–	–	–	–	–	–	–	–	–
No treatment	0	1	0	1	4	1	4	3	0	1
Other	0	2	0	1	–	–	–	–	–	–
TOTAL	27	209	71	111	104	75	94	95	7	9
	$\chi^2 = 16.7543$ DF = 6.0000 $P < 0.05$ significant at 5% level		$\chi^2 = 3.3602$ DF = 6.0000 $P > 0.05$ not significant at 5% level		$\chi^2 = 15.8783$ DF = 6.0000 $P < 0.05$ significant at the 5% level		$\chi^2 = 4.3623$ DF = 6.0000 $P > 0.05$ not significant at the 5% level		$\chi^2 = 7.7372$ DF = 4.0000 $P > 0.05$ not significant at the 5% level	

6.4.5 Cost of treatment

The analysis of the data on the cost of treatment for illness showed that 9.8% of all treatments had been obtained free, whereas 61.7% were treated for less than Rs 40, and 17.4% had been treated for Rs 100 and over. The sex ratios for treatment by cost were more or less close to unity (Table 6.15).

The sex ratios,for cost of treatment within each age group, showed that in the age group 0-4 the ratios were 0.60 and 0.89 for payments of Rs 10 and under, and rose with an increase in payments to 1.95 for Rs 100 and over. A similar trend in the increase in the maculinity of the ratios with an increase in the amount paid was observed for the age group 5-14. For the two subsequent age groups, 15-29 and 30-44, there was a reversal in the trend, i.e. there was a decrease in the masculinity of the ratio with an increase in the amount paid. In the age group 45 and above, there was no clear-cut trend, but there was a noticeable preponderance of males in the higher costs of treatment (Table 6.16).

Tests of significance were carried out to assess whether the sex-differentials observed within each age group by cost of treatment was statistically significant. The χ^2 results showed a P<0.001, i.e. a significant difference at the 0.1% level for the first three age groups; a significant difference at the 1% and 5% level for the next two age groups; and a difference that was not significant at the 5% level for the age group 45 and over (Table 6.17).

Table 6.15

Cost of Treatment by Sex
(Percentages in brackets)

Amount Rs	Males	Females	Total	Sex Ratio
0	618 (5.1)	564 (4.7)	1182 (9.8)	1.10
1-9	1809 (15.0)	1751 (14.5)	3560 (29.5)	1.03
10-19	1178 (9.8)	1161 (9.6)	2339 (19.4)	1.01
20-39	779 (6.5)	754 (6.3)	1533 (12.8)	1.03
40-59	424 (3.5)	391 (3.2)	815 (6.7)	1.08
60-79	176 (1.5)	162 (1.3)	338 (2.8)	1.09
80-99	92 (0.7)	98 (0.8)	190 (1.5)	0.94
100+	1139 (9.4)	964 (8.0)	2103 (17.4)	1.18
Total	6215 (51.5)	5845 (48.4)	12060 (99.9)	1.06

Table 6. 16

Sex Ratios for Amount Paid for Treatment by Age

Amount Rs	0-4	5-14	15-29	30-44	45+
0	0.60	0.88	1.65	1.73	1.12
1-9	0.89	1.20	1.08	0.83	0.96
10-19	1.19	1.10	0.97	0.81	0.89
20-39	0.98	1.25	0.91	0.89	1.00
40-59	1.70	1.58	0.95	0.70	0.98
60-79	1.05	1.40	1.28	0.72	1.05
80-99	1.13	1.35	0.61	0.86	1.04
100+	1.95	1.77	0.87	0.98	1.34
TOTAL	1.00	1.21	1.02	0.92	1.08

Table 6.17

Test of Significance by Amount paid for Treatment by Age and Sex

Amount Rs	Age 0-4 M	F	5-14 M	F	15-29 M	F	30-44 M	F	45+ M	F
0	71	117	182	208	182	110	109	63	74	66
1-9	406	458	734	611	330	305	151	182	188	195
10-19	228	191	407	369	249	256	144	177	150	168
20-39	115	117	272	218	154	169	107	120	131	130
40-59	63	37	114	72	104	110	63	90	80	82
60-79	22	21	38	27	50	39	28	39	38	36
80-99	9	8	23	17	17	28	19	22	24	23
100+	76	39	205	116	248	285	257	261	353	263
Total	990	988	1975	1638	1334	1302	878	954	1038	963
	$\chi^2 = 41.1191$, DF = 7.0000, $P < 0.001$, significant at the ·1% level		$\chi^2 = 26.5107$, DF = 7.0000, $P < 0.001$ significant at the ·1% level		$\chi^2 = 25.9300$, DF = 7.0000, $P < 0.001$, significant at the ·1% level		$\chi^2 = 23.0311$, DF = 7.0000, $P < 0.01$, significant at the 1% level		$\chi^2 = 12.0613$, DF = 7.0000, $P > 0.05$, not significant at the 5% level	

6.4.6 Prevalence of tuberculosis

The analysis of the data on tuberculosis showed that 1.08% of the total male population was reported to have had tuberculosis as opposed to 1.16% of the total female population. There was an increase in the cases of tuberculosis with age, so that the age groups 30-44 and 45 and over contained 51.6% of the total number of reported cases of tuberculosis.

The sex ratio was low, 0.50, for infants under one year of age, and was 3.00 and 1.69 for the two subsequent age groups. It fell to 0.88 and 0.56 in the reproductive ages of 15-29 and 30-44. For those 45 and over the ratio was 1.10 (Table 6.18).

The χ^2 statistical test showed no significant sex difference by age in the prevalence of tuberculosis at the 5% level (Table 6. 19).

6.4.7 Immunization status

Immunization in this study referred to vaccination against smallpox. The data showed that 32.4% of all those that had been vaccinated were from the age group 5-14. There was a decreasing trend on either side of this age group, with only 16.1% vaccinated among those 45 and over and 9.4% among the 1-4 age group.

The ratios showed a masculinity at all ages, except for the age group 1-4 and 30-44, where the ratio was close to unity (Table 6.20).

The χ^2 results showed a $P < 0.01$, i.e. the sex difference observed by age was statistically significant at the 1% level (Table 6.21).

TABLE 6.18

Age and Sex Distribution of tuberculosis

(PERCENTAGES OF TOTAL with tuberculosis by sex)

Age Group	MALES	FEMALES	TOTAL	Sex Ratio
-1	1 (1.3)	2 (2.5)	3 (1.9)	0.50
1-4	6 (7.6)	2 (2.5)	8 (5.1)	3.00
5-14	22 (27.8)	13 (16.7)	35 (22.3)	1.69
15-29	14 (17.7)	16 (20.5)	30 (19.1)	0.88
30-44	14 (17.7)	25 (32.1)	39 (24.8)	0.56
45+	22 (27.8)	20 (25.6)	42 (26.8)	1.10
TOTAL	79 (99.9)	78 (99.9)	157 (100)	1.01

1.08% of the total male population has had tuberculosis

1.16% of the total female population has had tuberculosis

Table: 6.19

TEST OF SIGNIFICANCE FOR INCIDENCE OF TUBERCULOSIS BY SEX AND AGE OF RESPONDENT

Age	MALES	FEMALES	TOTALS
0 - 4	7	4	11
5 - 14	22	13	35
15 - 29	14	16	30
30 - 44	14	25	39
45+	22	20	42
TOTAL	79	78	157

$\chi^2 = 6.4575$

Degrees of freedom = 4.0000

$P > 0.05$, not significant

There is no statiscally significant sex difference in tuberculosis at 5% level.

TABLE 6.20

Age and Sex Distribution of Vaccination STATUS.
(PERCENTAGES IN BRACKETS)

Age Group	MALES	FEMALES	TOTAL	Sex Ratio
-1	117 (1.0)	100 (0.8)	217 (1.8)	1.17
1-4	566 (4.6)	586 (4.8)	1152 (9.4)	0.97
5-14	2179 (17.9)	1772 (14.5)	3951 (32.4)	1.23
15-29	1619 (13.3)	1401 (11.5)	3020 (24.8)	1.16
30-44	953 (7.8)	924 (7.6)	1877 (15.4)	1.03
45+	1053 (8.6)	916 (7.5)	1969 (16.1)	1.15
TOTAL	6487 (53.2)	5699 (46.7)	12186 (99.9)	1.14

86.7% of the total population had been vaccinated.

Table : 6.21

TEST OF SIGNIFICANCE FOR VACCINATION STATUS BY SEX AND AGE OF THE RESPONDENT.

Age	Males	Females	Totals
0-4	683	686	1369
5-14	2179	1772	3951
15-29	1619	1401	3020
30-44	953	924	1877
45+	1053	916	1969
TOTAL	6487	5699	12186

$\chi^2 = 16.7637$

degrees of freedom = 4.0000

$P < 0.01$, significant

The sex difference in vaccination is statistically significant at 1% level.

6.5 FAMILY PLANNING ANALYSIS

The data on family planning was analysed in terms of knowledge of family planning, use of family planning and sources of contraceptives.

6.5.1 Knowledge of family planning

From a total population of 5561 ever married persons, 92.1% of all ever married males and 89.0% of all ever married females had heard of family planning. Among those who had heard of family planning, the highest percentage of 36.0% were from the age group 30-44, and the lowest of 0.1% from the age group 5-14.

The sex ratio for the total population who had heard of family planning was 0.90. A closer examination of the sex ratios showed that the masculinity was low at all ages, except for those who were 45 and over, where there was a marked preponderance of males of 1.29 among those who had heard of family planning (Table 6.22).

6.5.2 Practice of family planning

From a total of 2502 currently married males, 1.8% were practising family planning at the time of interview; the corresponding figure for females was 2.6% from a total of 2610. The highest percentage of 5.8% of males and females practising family planning was from the age group 30-44, and the lowest of 2.3% in the age group 15-29 (Table 6.23).

Table 6.22

PERSONS WHO have heard of Family Planning by Sex and Age (percentages in brackets)

Age	HEARD of Family Planning Males	Females	Total	Sex Ratio
5-14	1 (0.01)	6 (0.1)	7 (0.1)	0.17
15-29	537 (10.7)	947 (18.8)	1484 (29.5)	0.57
30-44	876 (17.4)	934 (18.6)	1810 (36.0)	0.94
45+	975 (19.4)	755 (15.0)	1730 (34.4)	1.29
TOTAL	2389 (47.5)	2642 (52.5)	5031 (100)	0.90

92.1% of all ever married males have heard of family and 89.0% of all ever married females.

Table 6.23

PERSONS PRACTISING FAMILY PLANNING BY Age and Sex as a Percentage of the Currently Married

	Currently Married Males	Males practising Family Planning	Percent in each age group	Currently Married Females	Females Practising Family Planning	Percent in each age group	Total
15-29	565	5	.9	973	14	1.4	2.3
30-44	912	16	1.8	951	38	4.0	5.8
45+	1204	24	2.0	679	16	2.4	4.4
Total	2502	45	1.8	2610	68	2.6	4.4

Among those practising family planning 47.8% were from the age group 30-44, 35.4% from those 45 and over, and 16.8% from the 15-29 age group.

The overall sex ratio of those practising family planning was 0.66. The only group which showed a masculinity in the ratio was 45 and over, where 1.50 males to every female were reported to be practising family planning (Table 6.24).

6.5.3 Source of contraceptives

Among respondents practising family planning 37.2% had obtained contraceptives from the family planning centre; 27.4% from shops; 15.0% from hospitals; 8.8% from dais or midwives; 7.9% from lady health visitors and 3.6% from sources that were not specified.

A closer scrutiny of the source of supply by sex showed a different pattern of supply for each sex. In the case of males 16.8% obtained their contraceptives from shops, 13.3% from family planning centres and 3.5% from hospitals; whereas in the case of females 23.9% obtained their supply from family planning centres, 11.5% from hospitals, 10.6% from shops, 7.0% from lady health visitors. Both males and females had obtained 4.4% from dais or midwives (Table 6.25).

Table 6.24.
Persons Practising Family Planning
(percentages in brackets)

Age	Males	Females	Total	Sex Ratio
15-29	5 (4.4)	14 (12.4)	19 (16.8)	0.36
30-44	16 (14.2)	38 (33.6)	54 (47.8)	0.42
45+	24 (21.2)	16 (14.2)	40 (35.4)	1.50
Total	45 (39.8)	68 (60.2)	113 (100)	0.66

TABLE 6.25

Sources of Family Planning by Sex
(percentages in brackets)

Sources	Males	Females	Total
Shop	19 (16.8)	12 (10.6)	31 (27.4)
Dai	5 (4.4)	5 (4.4)	10 (8.8)
Hospital	4 (3.5)	13 (11.5)	17 (15.0)
LHV	1 (0.9)	8 (7.0)	9 (7.9)
FPC	15 (13.3)	27 (23.9)	42 (37.2)
Other	1 (0.9)	3 (2.7)	4 (3.6)
Total	45 (39.8)	68 (60.2)	113 (100)

6.6 DISCUSSION OF RESULTS

The discussion of the results was considered in two sections. The first section was devoted to the specific findings on health, and the second section included the findings on family planning.

6.6.1 Health

The findings on health were considered under seven major headings as given below.

A. Respondents with illness episodes

In the study 85.8% of the total population reported having had an illness in the one year period prior to the interview. The high percentage of persons suffering from illnesses is in keeping with the belief that most people in the region suffer chronically or intermittently from one form of illness or another (Myrdal, 1968, p. 1575). Similar figures of a morbidity rate of 76% and 86% have not been uncommon in other studies which have taken a reference period of one year prior to the date of interview.[6] It is generally accepted that the number of illnesses tends to increase with an increase in the time period.

The sex ratio of the reported illness was 1.06 which was slightly lower than the masculinity of the enumerated population of 1.08.

B. Treatment for illnesses

The data showed that 94.3% of the respondents obtained Western treatment for illnesses; of this 52.4% were treated by compounders alone, who usually limit their treatment to the supply of drugs. Treatment by traditional practitioners accounted for only 0.7% of all treatments. These figures are not in agreement with other Indian studies which have shown a greater utilization of traditional medicine relative to Western medicine by the rural population.[7] The differences in the findings may be largely due to the fact that the present study made no provision for information on the combination of treatments. Therefore, the respondents may have over-reported the use of Western medicine when they were using it in combination with local remedies.Furthermore, reports on use of traditional medicine only included treatment by trained yunani practitioners or hakims, who practise in towns and city centres, and excluded other forms of traditional treatment(Chapt. 3, Sec.3.6.4).

The sex ratios of illnesses showed a preponderance of males for treatment by doctors(1.21), hospitals (2.01), traditional medicine (1.49), and visits to shrines (1.42). Females,on the other hand, were treated more often by compounders (0.99), health centres (0.89), and in receiving no treatment (0.22). The χ^2 tests showed that the difference in the use of treatment by sex was statistically significant.

Comparison of treatment by sex within each age group showed the highest masculinity in the sex ratio (2.60) for the age group 0-4 for treatment by hospitals, and the lowest (0.48) for no treatment for illnesses. This pattern of high sex ratios for treatment by hospitals and low sex ratios for no treatment was observed at other ages. The differences were statistically significant at the 0.1% level.

The sex-differentials in treatment of illnesses observed, to the disadvantage of females, may be attributed to the _pardah_ system and other related factors (Chapt. 3, Sec. 3. 4.1.C). This results in males being more mobile than females and therefore benefiting from professional treatment by doctors, hospitals and _hakims_ or indigenous practioners, who are only found in cities. Females, on the other hand, have to be satisfied with local treatment by para-medicals, i.e. compounders and health centre staff. Furthermore, the data on the sex-differentials by age show a consistent neglect of females in treatment for illnesses. This supports the findings of other studies on the subject (Batanagar, 1961, _op. cit._ in Chapt 2, footnote 19).

C. Disease categories

The distribution of the main disease categories showed that the largest group (44.9%) consisted of diseases of the respiratory system; the next largest group was that of infective and parasitic diseases(31.2%), followed by diseases of the digestive system (4.6%), accidents and violence(3.2%), and diseases of the nervous system (2.3%). The results are in keeping with the distribution of diseases in the developing countries with small variations (Myrdal, 1968, pp. 1574-1575).[8] The variations observed may reflect errors in the reporting of symptoms. However, the outstanding feature of the distribution of disease is the high incidence of illnesses due to accidents and violence. This can be explained by the Pathan code of honour which requires badal, or revenge by retaliation for a wrong suffered (Chapt. 3, footnote 10).

D. Treatment for major diseases

Persons with respiratory and infectious diseases sought treatment by compounders, whereas treatment for the other diseases was mainly by doctors, hospitals, health centres and traditional medecine.

The sex-differentials in treatment were significant for the respiratory, infectious,genito-urinary and skin diseases at the 0.1% level for the two former and 5% for the two latter.

Respiratory diseases: In this category men were treated more often than females by doctors(1.22) and hospitals (3.91); whereas females resorted more often to treatment by health centres (0.74), traditional medicine (0.92), and no treatment (0.53). Both males and females received equal treatment by compounders and visits to shrines.

Infectious diseases: Treatment for infectious diseases showed the same pattern as treatment for the respiratory diseases, i.e. preponderance of males for all forms of Western treatments except treatment by health centres.

There was also a masculinity bias in the treatment by traditional medicine. However, the difference in no treatment received for infectious diseases (0.48) was more marked than in the case of respiratory diseases.

Genito-urinary diseases: This category manifested an excess of females for all forms of treatment except treatment by traditional methods (2.00).

Skin diseases: There was a preponderance of males for treatment by doctors (1.90) and hospitals (4.50); whereas females exceeded males in treatment by compounders (0.80) and traditional methods (0.50).

The results showed that in the three disease categories, excluding genito-urinary complaints, where the difference in treatment by sex was statistically significant, males were at an advantage in receiving better medical care than females. The possible reasons for this have already been stated (Chapt 6, Sec. 6.6.1.B). The low sex ratios observed in the case of the genito-urinary diseases may have been the result of combining the data on diseases of the uterus and other female organs with those of the urinary system, which may have inflated the figures for females.

E. Cost of treatment

The differences in the amount paid for treatment were statistically significant at the 0.1% level for the first three age groups and at the 1% level for the fourth age group.

In the younger age groups, 0-4 and 5-14, the sex ratio was low (0.60 and 0.89), for cost of treatment of Rs. 10 and under. The masculinity in the ratios showed an erratic increase with an increase in the amount paid, so that for payments of Rs. 100 and over the ratios showed a preponderance of males

(1.95 and 1.77).

The reverse pattern was observed for the age groups 15-29 and 30-44, i.e. the sex ratios decreased with an increase in the payments, showing a preponderance of females for payments of Rs. 100 and over (C.87 and 0.98).

This clearly underlines that young females either receive free treatment or treatment at low cost, because of cultural attitudes which consider female children a burden (Bastanagar, 1961, op. cit. in Chapt. 2, footnote 19). On the other hand, in these patriarchal societies women are valued in their reproductive ages because they are potential mothers (Boserup, 1970, p. 47), and therefore, as the data shows, they tend to receive more costly treatment for illnesses.

F. Prevalence of tuberculosis

Among the respondents interviewed 1.08% of the total male population reported having had turberculosis, as opposed to 1.16% of the total female population. Among those who had had tuberculosis, the largest number of cases (24.8%) were from the age group 30-44.

The masculinity ratio was low for those under one (0.50), but rose sharply in the next age group of 1-4 (3.00). Females were at a disadvantage in the reproductive ages 15-29 (0.88), and 30-44 (0.56). For those 45 and over the sex ratio was high (1.10).

The population reported to have had tuberculosis (1.12%) is relatively high when compared with the figures for India, in 1960-1962, where the number of cases reported annually was 90-100 per 100,000 population. However, it was believed that the true figure for India was substantially higher.[9] Furthermore, it has been stated that tuberculosis is higher in Pakistan than in India (Davis, 1951, p. 56).

The sex -differential in the prevalence of tuberculosis was not statistically significant at the 5% level. However, the pattern of the higher rate of tuberculosis among females between the ages of 15-44 is in keeping with the findings of other studies (Ibid., p. 56; R.A.Kiste, op. cit. in Chapt. 2, footnote 25).It is also possible that there may have been some under-reporting of females with tuberculosis, because young girls with tuberculosis are not considered marriageable (Chapt. 3, Sec. 3.6.1).

G. Immunization status

In the study population 86.7% of the total population was reported to have been vaccinated against smallpox. The highest number who had been vaccinated (32.4%) were from the age group 5-14; and the lowest number (9.4%) from the age group 1-4.

The overall sex ratio for vaccinations was 1.14. There was a high masculinity at all ages except in the age group 1-4 (0.97). The sex difference in vaccination by age was statistically significant at the 1% level.

The results compare favourably with the vaccination figures for India for the years 1962-1965, where 75% of the population was reported to have been vaccinated.[10] In Pakistan, at that period, only 30% of the population was reported to have been vaccinated.[11]

There are no studies to date that examine sex-differentials in vaccination status. However, the results show a higher incidence of vaccination among males, which is in keeping with the customs of the society, i.e. a hesitation to have young unmarried females or young married females vaccinated because of the pardah system.

6.6.2 Family planning

The findings on family planning will be given under the headings listed below.

A. Knowledge of family planning

The family planning results showed that 92.1% of ever married males and 89.0% of ever married females had heard of family planning. The largest number among those who had heard of family planning (36.0%) was from the age group 30-44, and the lowest from the age group 5-14 (0.1%).

The sex ratio for those who had heard of family planning was 0.90. This excess of females was maintained at all ages, except for those 45 and over (1.29).

The figures on knowledge of family planning compare favourably with the findings of the West Pakistan study, where 94% females and 89% males were reported to have heard of family planning.[12]

B. Practice of family planning

Among the population that was currently married only 2.2% were practising family planning. The highest number practising family planning (47.8%) were from the age group 30-44, and the lowest (16.8%) from the age group 15-29.

The sex ratios among those practising family planning had a preponderance of females except for those 45 and over (1.50).

The results show a very low practice of family planning in the study population when compared to the findings of the studies quoted above. However, this may be due to the fact that the population was entirely rural: in rural districts the need for a large labour force for agricultural purposes and the strict tribal rules and customs governing behaviour within marriage make people less receptive to the concept of family planning.

C. Source of contraceptives

Among those practising family planning the main source of supply of contraceptives was the family planning centre (37.2%), shops (27.4%) and hospitals (15.0%). Dais and lady health visitors provided a much smaller source of supply (16.7%).

The pattern of supply differed for the sexes. In the case of males the main source of supply was shops (16.8%), whereas in the case of females it was the family planning centre (23.9%). The differential may be due to the fact that family planning centres are generally adjacent to, or form part of, the health centres and are therefore more readily accessible to females.

6.6.3 The hypothesis considered

In the light of the evidence examined, it can be concluded that there are sex-differentials in health care and low levels of family planning to the detriment of females.

6.7 CONCLUSION

The aim of this chapter was to test the hypothesis that there are sex-differentials in health care and low levels of family planning to the detriment of females. The quality of the data was assessed in terms of diagnostic accuracy and accuracy of reports. The assessment was based on broad impressions. With regard to diagnostic accuracy it was accepted that, because the study was not carried out by medically trained personnel, it is probable that there was substantial error in the types of illnesses reported. This error would have been greater in the case of females, because their illnesses are less often attended by trained medical staff. To increase the accuracy of the reports, it would have been advisable to take a recall period of less than one year. However, the requirements of the study called for a greater incidence of events, in order to establish sex-differentials in health care. There was no reason to believe that a recall period of one year would have resulted in a sex-differential bias of over-reporting or under-reporting. Furthermore, the fact that the data were collected from the heads heads of households would not have affected the accuracy of the responses, because the head of the household controls all the actions and movements of the members of his family, and would therefore be aware of the outcome of illnesses and cost of treatment for all members, except in cases where the illness was treated at home or not treated. Similarly with regard to family planning, it was unlikely that the female practice of family planning was underestimated, because it would be very rare in the study population for a wife to be practising family planning without the knowledge of her husband; and in a society where family planning is associated with health, there is no reason to believe that men would withhold such information because of its personal nature when they were willing to provide information on the female illnesses of their wives.

The results showed that 85.8% of the total population had suffered from some form of illness in the one year period prior to the study. This result was in agreement with other studies which have taken a recall period of one year. The sex ratio of reported illnesses of 1.06 was slightly lower than that of the enumerated population of 1.08.

The data on the treatment of illnesses showed that 94.3% of the respondents obtained Western treatment for illnesses, 52.4% of which was treatment by compounders. These findings were not in agreement with the Punjab studies which have shown a greater utilization of traditional medicine among the rural population. The discrepancy may be due to the fact that the present study made no provision for information on the combination of treatments. Therefore, respondents may have over-reported the use of Western medicine when it was being used in conjunction with other local remedies.

There was a significant difference in the treatment for illness by sex; males were treated more often by doctors, hospitals, traditional medicine, visits to shrines; whereas females were treated more often by compounders and health centres, or received no treatment at all (especially in the younger age groups). The sex-differentials in treatment were attributed to the pardah system and other related factors, which results in females being less mobile than males. The failure to treat young females supported the findings of other studies, namely that the neglect of female children is still prevalent.

The distribution of the main disease categories showed that the largest group consisted of diseases of the respiratory system, the next largest group being infective and parasitic diseases, followed by diseases of the digestive system and accidents and violence. The results were in keeping with the distribution of diseases in other developing countries with a few variations. The outstanding feature was the high incidence of illnesses due to violence and accidents. This was attributed to the Pathan code of honour which requires badal or revenge for a wrong suffered.

The sex-differentials in treatment were significant for the respiratory, infectious, skin and genito-urinary diseases. For the first three categories, men were treated more often by doctors and hospitals than females. For the genito-urinary complaints women were treated more often by doctors and hospitals than males. The small number of males, as compared with females, in this last category, may be partly attributed to the combination of the diseases of the uterus with those of the urinary system which inflated the figures for females.

The analysis of the cost of treatment showed that there was a significant difference by sex and age. In the younger ages females outnumbered males in the free treatment or treatment at low cost category, whereas in the reproductive ages females outnumbered males in the higher payments made for treatment of illnesses.

In the population 1.12% of the population was reported to have had tuberculosis. These figures exceeded those for India in 1960-62, but it is generally accepted that more persons suffer from tuberculosis in Pakistan than in India. The sex-differentials in the prevalence of tuberculosis showed that females reported higher rates between the ages of 15-44, but the sex-difference was not statistically significant. This was attributed to the possible under-reporting of females with tuberculosis, because of the social stigma attached to this disease.

In the population 86.7% of the population had been vaccinated. The results compared favourably with the vaccination rates for India in 1962-65, but were in disagreement with the rates for Pakistan in those years. The sex-differential in vaccination status was significant and was attributed to the pardah system, i.e. hesitation to have young unmarried, or young married, girls vaccinated.

The results on family planning showed that 92.1% of ever married males had heard of family planning, and 89.0% of ever married females. These figures supported the findings of other studies in Pakistan. However, although a large number of the married population had heard of family planning, only 2.2% of the currently married couples were found to be practising it at the time of the study. There was a preponderance of females practising family planning at all ages except for those 45 and over. The results deviated substantially from the higher rates of practice found in other studies. This was attributed to the fact that the population studied was entirely rural, observing strict rules and customs in their marital behaviour.

Among those practising family planning the main source of supply was the family planning centre followed by supply from shops, hospitals, dais and lady health visitors. The pattern of the supply differed for the sexes. In the case of males, the main source of supply was shops, whereas in the case of females, it was the family planning centre. The differential was attributed to the fact that family planning centres, like health centres, are more readily accessible to females.

FOOTNOTES

1. T.Purola, K.Sievers, E.Kalimo and K.Nyman, *The Utilization of the Medical Services and its Relationship to Morbidity, Health Resources and Social Factors* (Helsinki: Research Institute for Social Security, 1965), p. 67.

2. A.Cartwright, 'Memory errors in a morbidity survey', *Milbank Memorial Fund Quarterly*, XLI (1963), 1, 5-24, at p. 5.

3. E.L.White and O.K.Sagen, 'Report on a programme of methodological studies on health interview surveys', in *Uses of Epidemiology in Planning Health Services, Proceedings of the Sixth International Scientific Meeting, Primosten, Yugoslavia, August 29- September 3, 1971,* (Belgrade: Savremena Administracija, 1973), pp. 34-46, at pp. 40-41.

4. J.S.Fowlie, *Statistical Tables for Students* (London: Oliver & Boyd, 1968), p. 8.

5. World Health Organization, *International Classification of Diseases* (8th Revision, Geneva: WHO, 1965), pp. 3-39.

6. C.Bridges-Webb, 'The Traralgon health and sickness survey', *International Journal of Epidemiology*, III (1974), 1, 37-46, at p. 37. See also E.L. Koos, *The Health of the Regionville:what people thought and did about it* (New York: Hafner Publishing Company, 1967), p. 39.

7. In a Punjab study it was found that treatment for illnesses reported in a period of two weeks prior to the study was as follows: 60% by indigenous practitioners, 20% by Primary Health Centres, 15% by qualified allopathic practitioners, and 4% by folk practitioners. D.N.Kakar, S.K.Srinivas Murthy and R.L.Parker, 'People's perception of illness and their use of medical care services in Punjab', *The Indian Journal of Medical Education*, XIX (1972), 4, 286-298, at p. 90.

8. The figures in the Tunisian study for the distribution of the diseases was: 24% respiratory diseases,19.5% digestive diseases, 7.2% skin diseases, and 8.6% non-specific diseases . A.Benyoussef, H.Christensen and A.F.Wessen, Pilot Study in Tunisia on the Utilization of the Outpatient Health Services in the Governorate of Nabeul (Geneva: WHO, 1972).

9. Government of India, Report of the Health Survey and the Planning Committee (New Delhi: Government Printing, 1961), p. 244.

10. India, The Fourth Five Year Plan:a draft outline (New Delhi: India, Government of ,Planning Commission, 1966), p. 341.

11. Pakistan, The Second Five Year Plan 1960-65 (Karachi: Pakistan, Government of, Planning Commission, 1960), p. 362.

12. Central Family Planning Evaluation Unit, Pakistan Journal of Family Planning, I (1967), 1-10.

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

7.1 CONCLUSION

Studies in sex-differential mortality have shown that, contrary to the experience of Western populations and other countries, the life expectancy of males in the Indian Subcontinent has been consistently greater than that of females, especially in the reproductive ages. The purpose of this study was to test the hypothesis that there are sex-differentials in mortality and health care, and low levels of family planning, to the detriment of females. Although a summary of conclusions has already been given at the end of each chapter, the main features of the investigation will be recapitulated under separate headings.

7.1.1 Study area

The study was carried out in 22 villages of Daudzai thana and Michni tribal area in the North West Frontier Province of Pakistan. The inhabitants of this region are, for the most part, Pathans of the Mohmand and Daudzai tribes. The population of the study area numbered 14,062 persons, with a sex ratio of 1084 males to a thousand females. The average number of persons per household was 6/7, and the most common family type was the elementary family, consisting of married couples and their unmarried children. Most families, 82.9%, were involved in agriculture: 52% owned 1-9 acres of irrigated land; 4.9% owned 10-59 acres; and only 5 families or 0.2% owned more than 60 acres.

Analysis of the budgets showed that 32% of families were in debt, mainly to moneylenders and relatives. Debts were chiefly incurred for agricultural activities or for ceremonials associated with birth, death or marriage.

Marriage was almost universal and generally patrilocal:

9.0% of all males stated that their birthplace was other than where they were settled, as opposed to 18.6% of all females. For ever married persons the figures were 13.3% and 35.0% respectively. The average age at first marriage was 19.39 years for females and 24.97 years for males. Only 4.0% of the households were polygamous, and divorce was virtually unknown.

As regards education, only 0.5% of all females had received one year of schooling. The literacy rate for males and females was 18.2% and 0.3% respectively.

7.1.2 Fieldwork

A complete enumeration of the 2070 households in the selected villages was undertaken by trained interviewers. Respondents were interviewed by means of a structured questionnaire covering socio-economic, demographic, health and family planning variables, which was pre-tested in a pilot study.

The data collection lasted for about a year. Before enumerating a village advance warning was given and a list of households was prepared. The interviewing team consisted of two full-time and several part-time male interviewers, the author and a *dai* or trained midwife. The males carried out the interviews in the *hujra* or guesthouse, whereas the females conducted a house to house census. The latter method was later abandoned and only heads of households or some other responsible male member was interviewed.

In addition to the usual problems of poor statistical awareness, found in most developing countries, the main obstacles encountered were related to women. Not only was it impossible to recruit female staff to work in the rural areas but, as a consequence of the *pardah* system, male interviewers were unable to carry out a house to house census. Therefore, the heads of households were interviewed in the guesthouse or the mosque, both situated, as a rule, on the outskirts of the village. In the long run this turned out to be an advantage, since female respondents proved to be unreliable.

7.1.3 Mortality

The quality of the mortality data was assessed in terms of sex-selective coverage and sex-selective mortality information. It was not possible to carry out a post-enumeration check; therefore the assessment of the data was based on broad impressions and indirect evidence. It was found, during the interviews, that heads of households were reluctant to mention the names of their female relatives, which suggests that there may have been a few omissions, but there was no evidence of a significant underenumeration of females. The indirect evidence was examined with regard to age distributions, the sex ratio of the total population, sex ratios of the marital statuses and the sex ratios of the under 30 and over 30. It was concluded that there may have been some underenumeration of females at the younger ages, but the more plausible explanation was that the deficit was partly genuine and partly the result of age misreporting.

The analysis of the retrospective mortality data showed that cultural factors such as widower remarriage, segregation of the sexes, polygamy and the preference for males, which is a characteristic of patriarchal societies, could have resulted in the greater under-reporting of female deaths, especially in early childhood.

Mortality was estimated separately for each sex by the indirect methods known as the Brass methods, based on the use of retrospective questions on childhood mortality and on orphanhood, widowhood and siblings status. The survivorship probabilities derived from these sources determined the calculation of α and β. The values of β obtained from the different methods were less than 1.0, indicating that adult mortality was low relative to infant and childhood mortality.

The life tables derived by the standard methods showed that, in all cases, the expectation of life at birth was greater for females than males. The advantage of females at birth was maintained at all ages.

The standard applications did not make allowance for the idiosyncracies of the data; therefore it was necessary to construct a life table by selecting the most reliable mortality estimates from the different methods, using model life table probabilities of surviving from the Carrier and Hobcraft one parameter life tables to represent the observed values. The sections were then joined together to give the l_x values.

In the results it was observed that the expectation of life at birth was 52.53 years for males and 52.51 years for females. The sexes showed an equality in the probability of dying, with a male excess between ages 10-25 and a female excess during the reproductive ages of 30-40 and at ages 60-70. This established unequivocally that female mortality was not lower than male mortality; in fact it was considered, if anything, a conservative estimate because of the better reporting of male deaths due to cultural factors.

The analysis of deaths by cause showed that 40% of female deaths between ages 20 and 45 occurred in childbirth and

17% were due to tuberculosis. Male deaths from violence accounted for 10% of total deaths in the age group 25-70, as compared with 7% from tuberculosis.

7.1.4. Health and family planning

The assessment of the quality of the data was based on broad impressions. With regard to diagnostic accuracy, it is probable that there was substantial error in the types of illnesses reported, because the interviewers had to rely on the respondent's diagnosis. However, this was in no way a handicap because the main purpose of collecting data on health care was to study sex-differential behaviour in response to illnesses. The fact that the information on illnesses was given by the head of the household would not have affected its accuracy; since he controls the actions of other members of the family, he would be informed of all illnesses and treatments for all members. Similarly, he would know whether or not his wife was practising family planning.

The results showed that 85.8% of the total population had suffered from some form of illness in the one year period prior to the study. The distribution of disease categories showed that respiratory illnesses, followed by infectious and parasitic diseases, diseases of the digestive system and illnesses resulting from accidents or violence, were the complaints for which respondents most frequently sought medical attention. The outstanding feature of these results was the high incidence of illnesses due to violence. This was attributed to the Pathan code of honour which requires badal or revenge for a wrong suffered.

There was a significant sex-differential in the treatment for illness. Males were treated more often by doctors, hospitals, traditional medicine and visits to shrines; whereas females were treated more often by compounders and health centres, or else received no treatment at all. This differential was attributed to the pardah system and other related factors which make females less mobile than males. The sex-differentials in treatment were significant for respiratory, infectious, skin, and genito-urinary diseases. For the first three categories, men were treated more often by doctors and hospitals than females; the reverse was the case for genito-urinary complaints.

The analysis of the cost of treatment showed a significant difference by age and sex. In the younger ages females outnumbered males receiving free treatment or treatment in the low cost category, whereas in the reproductive ages 15-44 females outnumbered males in the higher payments made for treatment.

The proportion of the population reported to have had tuberculosis was 1.12%. Females reported higher rates than males between the ages of 15 and 44, but the difference was not statistically significant.

A large proportion of the population, 86.7%, had been vaccinated against smallpox. The sex-differential in vaccination status was significant and was attributed to the pardah system, which would make men hesitant to allow young married or unmarried girls to be vaccinated.

The results on family planning showed that, although 92.1% of ever married males and 89.0% of ever married females had heard of family planning, only 2.2% of married couples were actually practising family planning at the time of the census. There was a preponderance of females practising family planning at all ages except for those aged 45 and over.

The main source of contraceptive supply was the family planning centre, followed by supply from shops, hospitals, dais and lady health visitors. The pattern of supply differed for the sexes: in the case of males the main source of supply was shops, whereas for females it was the family planning centre. The differential was attributed to the fact that family planning centres are more accessible to females.

In the light of the evidence examined it was concluded that there was validity in the hypothesis under investigation.

7.2 RECOMMENDATIONS

This study has shown that, in a structured society such as that of the Pathans, the individual is governed in his behaviour by the beliefs and customs of the family, and that these in turn are controlled by the social, religious and economic traditions of the tribe. Therefore, for a development programme to be successful, it must work within the framework of the community's beliefs and customs. In this way both the planner and the population will be working towards the same goal.

In view of these considerations, the following recommendations have been made for the development of rural women in the area. These recommendations are based on development plans which to date have been used exclusively for the benefit of the male population.

It is proposed that an experimental project be carried out in 10-20 villages. It should consist of a federation of women's cooperative organizations at the headquarter level and village cooperative organizations at the grass-root level.

7.2.1. Federation of women's cooperative organizations

A centre of development administration should be established either at the level of the tehsil or administrative unit; or that of the thana or police ward. It should be staffed by organizers and experts in maternal and child health care, health, family planning and household economy. Their duties would include organization, training, guidance of village women, and maintenance of records.

A. Organization

The organization at the village level is believed to be of paramount importance for the success of any development programme. Therefore it would be necessary for female organizers who have received the necessary training to organize the villagers.

This would be done by first enlisting the support of the village headmen or other elders of the village and contacting the women through them, either individually or in groups, in their homes or in some other convenient place. The aim of the meeting would be to discuss the problems of the village women and awaken and arouse their interest for collective action to solve their problems. This process of education and motivation would lead to other meetings, where the problems would be taken up for detailed discussion and thoroughly worked out until priorities have been determined. The organizers would also emphasize that, just as priorities can only be determined by group discussions, so solutions can only be sought by means of group efforts.

The village women would also be asked to formalize their organization by becoming members. Membership would involve the regular attendance of weekly meetings and sending its office bearers for participation in the fortnightly training programmes that would be organized at the federation level. The representatives of the organization would be elected by the members, and would consist of a President, preferably a male member with authority, and a manager and an assistant, both of whom would be females.

The village organizations would form the cooperative federation at the headquarter level, so that as soon as a scheme was approved it would be executed through the village cooperative organizations.

B. Guidance and training

The problems encountered at the village level would be discussed with the experts and the best solutions within the context would be proposed. Fortnightly training would also be extended in health education, family planning, maternal and child care etc.

C. Maintenance of records

The representatives of the village cooperative organizations would also be expected to report all births and deaths that have occurred in their village together with acceptance and discontinuation of family planning.

7.2.2 Village cooperative organizations

The village cooperative organizations would consist of all the village women who can be persuaded to join, and the representatives would be a president, or a responsible male member of the community, and two female members elected by the members. Their duties would include a discussion of local problems to be brought to the notice of the headquarters, dissemination of training in weekly meetings received at the headquarters and an up-to-date record, with the assistance of an educated male member, of all the births, deaths, acceptance and discontinuance of family planning etc. to be reported to the headquarters.

We will end with the words of Dr. A. Hameed Khan of the Comilla project on the subject: 'a programme of this kind is essentially long-term. Its aims cannot be achieved in a year. Organization takes time as does the construction of the physical infrastructure. If the initial work is done thoroughly there would soon be a gathering momentum. The capacity of more and better work will grow rapidly' (Khan, et al., p. 23).

RECOMMENDATIONS FOR THE DEVELOPMENT OF RURAL WOMEN

> Skills acquired at the Fed. level and disseminated to Members of WCO

> Problems & Progress at the village level brought to the notice of the Fed. by Reps. of WCO

INTERNATIONAL PLANNED PARENTHOOD FEDERATION
EVALUATION AND SOCIAL SCIENCES DEPARTMENT

SS
10/1/75

APPLICATION FOR RESEARCH GRANT

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1. TITLE OF PROPOSED PROJECT

SEX DIFFERENTIALS IN MORTALITY: A STUDY OF THE STATUS OF WOMEN IN PAKISTAN.

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2. NAME OF APPLICANT
Aisha Ahmad

3. NAME AND ADDRESS OF LOCAL RESEARCH INSTITUTION INVOLVED IN PROJECT

London School of Hygiene & Tropical Medicine, London W.C.1

Rural Academy of Peshawar, Peshawar, NWFP, Pakistan.

4. NAME AND POSITION OF SCIENTIFIC SUPERVISOR FROM ABOVE INSTITUTION

Professor W. Brass, Professor of Medical Demography

Mr. S. Sultan, Director of the Rural Academy of Peshawar

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5. DETAILS OF PROJECT

(a) Major objective of project (approx. 20 words)
(i)To determine whether there is a sex differential in mortality.
(ii)To study the status of women expressed in terms of sex differential health care, education, employment, nutrition etc.
(iii)To see whether high female mortality is associated with the low status of women.
(iv) To make recommendations to Government bodies & International Organizations.

(b) Duration of project
9-12 months in the field(starting Sept.1975)

(c) Summary (approx. 250 words)
Study Area & People:The North West Frontier Province is the northernmost province of Pakistan. It covers an area of 39,283sq. miles. The population in 1970 was about 8 million. The NWFP is inhabited largely by Pathan tribes. Pathan tribal society is part of the larger tradition of the Islamic world. Islamic principles, cultural mores and jural tradition explain part of the Pathan normative behaviour. Pathan society also shares the Pashto language and one Code of Honour:'Puktunwali'(The way of the Pathan).
Objectives:The following information will be required:
(i)Demographic characteristics:name, relationship, age, sex, marital status.
(ii)Mortality & Fertility Data:The survey will collect retrospective information on mortality and fertility. Data on the population sampled will be related to the death and births of their children and relatives that occurred in the past(Childhood, Orphanhood,Widowhood & Siblings Method). These statistics, although averages of what has occurred in the past, have proved powerful for estimating recent mortality and fertility in many developing countries.
(iii)Attitudes to Women & Their Manifestation:Pathan society might legitimately be called patriarchal. In the family the husband or father has all the authority;he controls the social intercourse of the family members, the property, and may use physical compulsion to enforce his authority. The study will enquire into the different ways in which the inferior position of women is expressed in the following contexts:A.Family Planning: family size goals;sex preference;birth control methods.B.Health:Illness; hospitalization;immunization;pregnancy care.C.Nutrition:Quantities of food consumed by type.D. Education, Employment &Income:Literacy;hours of work; expenditures on male/female necessities.

5. cont'd.

(d) Review of previous relevant research work and other projects which can be considered as a "baseline" for the proposed project:

SHORTAGE OF WOMEN:An interest in the present research project was guided by an attempt to explain the shortage of women in the Indian Subcontinent.The sex ratio,which is the index of the sex composition of a given population (number of males per % females),has the following pattern.Male children are more numerous than female children(106 males per %females) at birth. This numerical advantage of males over females is soon eliminated by the relatively high mortality amongst males. With each advancing age-group the sex ratios move in the direction of a balance until, at a certain point,females begin to outnumber males(Coale & Hoover. Population Growth & Economic Dev. in Low Income Countries, 1959). Pakistan, India and Ceylon are the exceptions to the general rule. In these countries males outnumber females at all ages(El-Badry. "Higher Female than Male Mortality in some countries of S.Asia", IPC,1969).
EXPLANATION:This shortage of females has been explained in terms of a less complete enumeration of the female population;a larger number of male births; a heavier mortality amongst females(Census Report 1901-1931).Recent studies of the sex ratio of the Indian Subcontinent have emphasized that the imbalance is due to the relative disadvantage of females in her chances of survival (Rukanuddin, A.R."A study of the sex ratio in Pakistan", Studies in the Demography of Pakistan, 1967. Visaria,P.M."The sex ratio of the population of India and Pakistan", in A.Bose ed.,Patterns of population change in India, 1967). The applicant reached a similar conclusion,i.e. the shortage of women was the result of a high female mortality(Ahmad, A.The Sex Ratio of Pakistan, M.Sc. report, LSH, 1972).
CAUSES: The main causes of high female mortality are:1.The practice of female infanticide(Census of India 1911), which, in modern times is reflected in the neglect of female children. For example, the expected number of deaths in the second year of life are equally distributed between males and females, but cultural factors can intrude to give a much higher rate to females(Gordon, J.E., J.B.Wyon, & W.Ascoli. The Second Year Death Rate in Less Developed Countries", American Journal of Medical Services, Vol. 254).At the weaning period, 6-24 months, malnutrition is more pronounced among female than among male children(Gordon & Wyon. The Khanna Study, 1971). 2. Maternal mortality: The gap between male and female mortality is greatest at the reproductive ages. This is due to a high fertility, which increases the rate of maternal deaths, particularly in the absence of good maternal care. This hypothesis is supported by the evidence available for the Hutterites(Eaton,J.W. & A.J.Mayer. Man's Capacity to Reproduce, Illinois, 1954). It has also been suggested that repeated pregnancies followed by prolonged lactation periods, and a lack of high quality protein in the diet, can result in the "maternal depletion syndrome". This causes premature aging and early deaths among females(Wray, J.D."Population Pressure on Families", Population Council Report, Aug. 1971). 3.Deaths due to infectious diseases:Women are more prone than men to infectious diseases because of their cultural condition. Women spend more time indoors; they nurse the sick. This makes them more vulnerable to diseases such as tuberculosis.This is supported by evidence which shows that the incidence of infection increases immediately after the age when girls begin to be confined to the home or to wearing the "purdah":veil(Davis, K. Population of India and Pakistan, 1951)
PROPOSED RESEARCH PROJECT:No research to date has made a comprehensive study of the negative effects of the status of women. It is the purpose of the proposed project to undertake this task.

5. cont'd.

(e) Detailed description of work to be undertaken, with time schedule:

1974/75: Preparation of the Research Design.

(i) Formulation of concepts.
(ii) Preparation of the questionnaire.
(iii) Preparation of the table outlines.
(iv) Designing the CENSUS

1975/76: Field Operations.

(i) Initial contacts: Contacts will be made with the administrative (Government and Family Planning), and political leaders of the District to enlist their cooperation.

(ii) Organizational headquaters for the survey will be set up.

(iii) Recruitment & Training: All the data will be collected by the applicant with the help of 5-6 interviewers. The minimum requirements for the selection of interviewers will be that they should be able to read and write, and are diplomatic and resourceful. Efforts will be made to recruit the interviewers from the Family Planning Association of Peshawar. After selection the interviewers will undergo a two week intensive training course on the subject of the survey and methods of interviewing.

(iv) Pilot Survey: This will be initiated within a few weeks from the start of the field operations. It will not only be used as a means of testing the questionnaire, but will also provide suitable practical training for the helpers. They will watch the interview being carried out and will be able to practise on the pilot population.

(v) Preparation & distribution of materials: Preparation of the final questionnaire, and its distribution with other materials to the interviewers.

(The above activities should take 1-1½ months).

(vi) Survey: The interviewers' activities will be closely supervized throughout the study. Each day following the completion of the fieldwork, the questionnaires will be edited and attempts made to remedy omissions and inconsistencies. It is estimated that, the 6 interviewers working in groups of two (male/female), would take ½hour-to 1hour to complete a schedule. At this rate 5-10 questionnaires can be completed a day, and it should take about 6-9 months to complete the entire census (2,000 households).

(The entire field operation will take approximately 10-12 months).

1976/77: Processing & Analysis: The completed questionnaires will be brought to London for data processing, analysis and interpretation of results.

5. cont'd.

(f) Description of how project would be useful to action programmes:

The census will collect information on the extent to which family planning and other services are used; and the extent to which use is related to the autonomy of women in the sphere of family building. Recommendations will be made on how best to adopt services to the cultural realities in areas such as the North West Frontier Province of Pakistan.

(g) How do you plan the dissemination and utilisation of the research findings?

The Ph.D. research findings will be rewritten and published with the help of the Rural Academy of Peshawar, and other interested research institues (Family Planning Association of Pakistan; Institute of Development Economics). The findings will be widely distributed to Government agencies; International organizations and Libraries in Pakistan.

(h) Relevance of project to family planning and other socio-economic development programmes?

This study will be the first of its kind, and is intended to provide information on the extent of deprivation suffered by women in the field of health, family planning, nutrition, education etc; and the negative effects of this deprivation which is manifested in a ~~higher~~ female mortality relative to men. This study should therefore be of interest to all organizations with programmes in these fields, and above all to those participating in the United Nations Women's Year, who are directly involved in collecting information on methods of improving the status of women in developing countries.

(i) Name(s), address(es) and position(s) of family planning/population and other programme people involved in this project.

Name: W.Brass
Position: Professor of Demography
Address: London School of Hygiene & Tropical Medicine, London W.C.1

Name: J. Simons
Position: Sociologist
Address: London School of Hygiene & Tropical Medicine, London W.C.1

Name: S.Sultan
Position: Ex-Secretary Health & Family Planning; Present Director Rural Academy
Address: Rural Academy, Govt. of NWFP, Pakistan

Name: Begum Salim
Position: Chairman Family Planning Association of Pakistan
Address: Family Planning Association, Peshawar, NWFP, Pakistan.

6. RESEARCH METHODOLOGY

6.1. Method:

Census: After having made a through study of the villages in the area, three/four villages will be selected. Some of the criteria for selection will be: the villages should represent in microcosm the economic, social and cultural structure of the community; they should together contain approximately 2,000 households; and they should not have been subject to excessive migration or immigration so as to distort the mortality and fertility estimates.

Once the villages have been selected, a complete census of all the households in the villages will be undertaken. The selection of 2,000 households as the limit has been determined in the light of experience from past surveys, and also by the fact that a larger number would be unmanageable given the resources of the present study.

6.2. Method of investigation and data collection

The data will be collected by a questionnaire to be completed for a sample of the population. Periodic visits will be made to the selected villages. The questionnaires will be completed in English at interviews that will be carried out in the people's homes. The interviews will be limited to adult men and women.

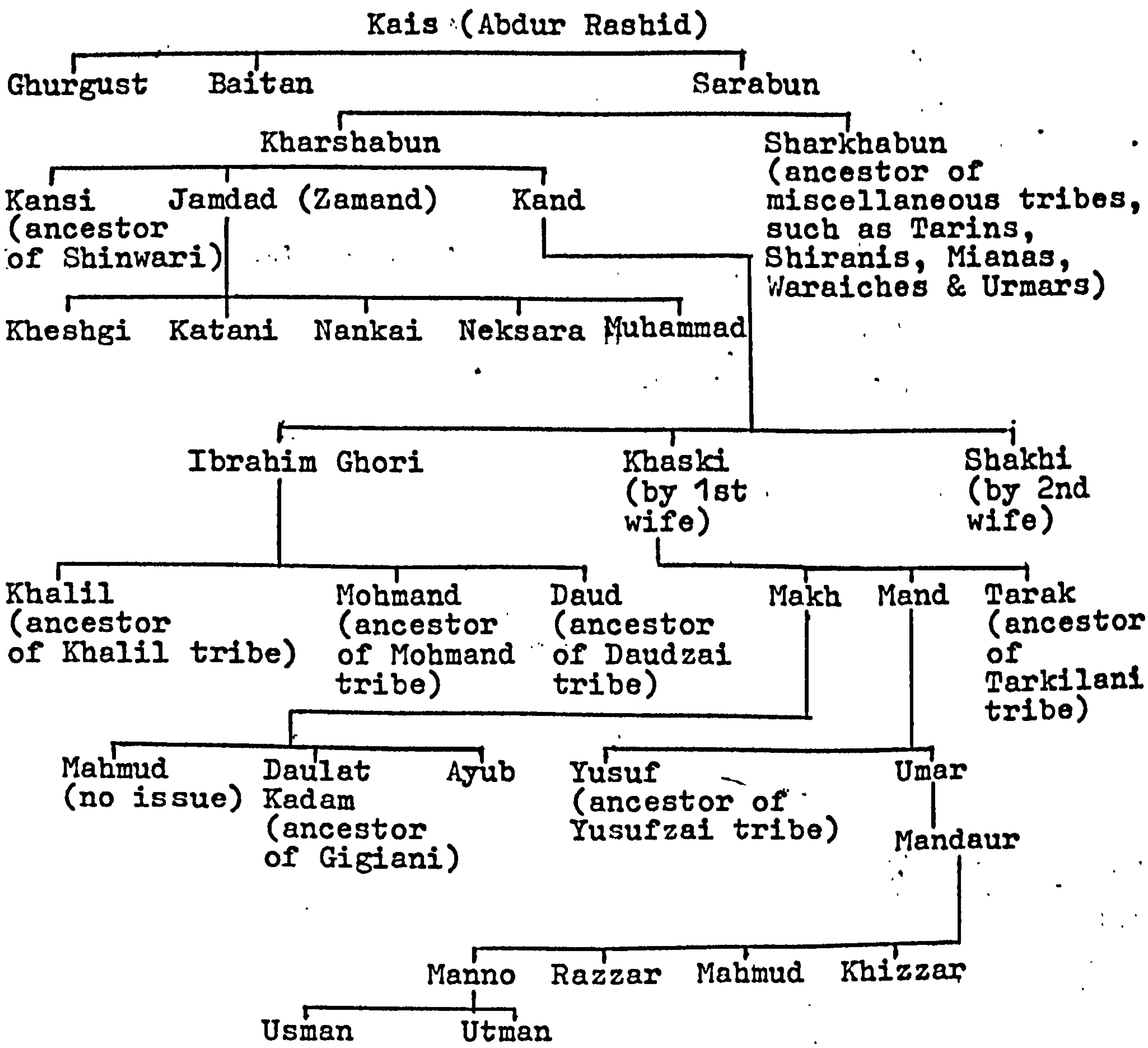
6.3. Type of data processing analysis : Coding, punching, tabulating.

Mortality and Fertility estimates: The estimates of mortality (male/female) and of fertility will be obtained by using techniques, that have been developed by Prof.Brass et al., specifically for use in countries like Pakistan, where information on mortality and fertility from conventional sources is limited and subject to error. The general aim of these techniques is to convert data from survey questions into conventional measures of mortality (through multiplying factors selected on the basis of the fertility function or the marriage function). The most recent is the sibling survivorship technique, which is very suitable for studying sex-diff.mort.

Relationships: To examine whether traditional families (defined in terms of low female status) experience a higher female mortality than modern families.

APPENDIX 2: GENEALOGY OF THE PATHANS

The main Pathan tribes are: Yusufzai; Muhammedzai; Gigiani; Daudzai; Khalil; Mohmand; and Khattack. All these, except the last, trace their descent from Kharshabun, son of Sarabun, one of the sons of Kais, alias Abdur Rashid. The genealogical tree is more or less mythical:-



Source: NWFP, 1931.

APPENDIX 3: GENEALOGY OF THE MOHMANDS

MOHMAND.

- Tarakzai.
  - Tarakzai proper.
  - Halimzai.
  - Isa Khel.
  - Burhan Khel.
- Baezai.
- Khwaezai.

Affiliated clans ... Dawezai, Utmanzai, Kukkozai. ... Kuchi and Udridunki.

Vassal clans ... Mandai Khel. Safis and Kandaharis. Mullagoris.

TARAKZAI.

- Dadu Khel.
  - Dalkha Kor.
    - Muradi Kor.
    - Asaf Kor.
  - Shah Mansur Khel.
    - Hyatai Kor.
    - Durma Kor.
      - Loe Shilman sections.
      - Morcha Khel.
- Kasim Khel.
  - Kani Khel.
  - Khalil Kor.

HALIMZAI.

- In Gandah.
  - Hamza Khel.
  - Kadai Kor.
  - Wali Beg Kor.
- [illegible]
  - Hamza Khel.
  - Ibrahim Khel.
  - Busha Khel.

KHWAEZAI.

- Maimand Khel.
- Doatta Khel.
- Khadi Kor.

BAEZAI.

- Usman Khel.
  - Khuga Khel.
  - Isa Khel.
  - Atamar Khel.
  - Koda Khel.
- Sepah.
  - Musa Khel.
  - Miro Khel.
  - Bara Khel.

UTMANZAI OF YAKHDAND.

- Amano Khel.
- Khadi Khel.

DAWEZAI OF PIPAL.

- Bazai.
  - Hassan Kor.
  - Anai Kor.
- Mamazai.
  - Haji Kor.
  - Khoedad Kor.

KUCHIS.

(1) UTMANZAI.

- Koli Kor.
- Bahadur Kor.
- Mirak Kor.

(2) DAWEZAI.

- Hassan Khel.
- Hazarbuz.
- Mandozai.
- Affiliated (Za Khel.)

Source: Merk, 1898.

APPENDIX 4: HISTORY OF THE STUDY VILLAGES

Shaghali Payan

Details of ownership are given in the Pedigree Register prepared by the Revenue Department. The village owns 8 shares of land (a portion from a total of 149 shares), which fell to the lot of Jehangir Khan. Some lands were also given by Raizi Khan to Sher Dil, heir of Najan Khan, due to kinship and common ancestry, but these were included in the lands of Shaghali Bala during the recent resettlement. The villagers belong to the Afghan Bazid and Mohmand tribes. They have tax-free status (muafi khor), and have been declared owner-occupants.

The village has always been known as Shaghali Payan. As regards the origin of the name, it has been explained as follows: the village is built on a stretch of land between two rivers (tāpū), where there once grew in abundance a type of plant called kahl, which was eaten by jackals (shaghal), and as the village is situated lower down than Shaghali Bala, it came to be known as Payan (lower); hence the name Shaghali Payan.

The village has been continuously inhabited since the day it was first established; it has never been dismantled or destroyed. There is no old barren land (banjar qadīm) in this region. The village is built in two places, and has no hamlet (banda).

The Pedigree Index shows that there are three clans in the village forming three kandis or quarters, (1) Kandi Mohmand Morcha Khel, (2) Kandi Mohmand Kani Khel, and (3) Kandi Afghan Bazid Khel:

(1)	(2)	(3)
Kandi	Kandi	Kandi
Mohmand Morcha Khel	Mohmand Kani Khel	Afghan Bazid Khel
Jehangir Khan	Najam Khan	Saadud Din

Note: no further details of pedigree are given.

Shaghali Bala

Details of ownership are given in the Pedigree Register. The village comprises 8 shares of land (out of 144 shares), that were left to the ancestors of the present inhabitants. The villagers have tax-free status, and have been declared owner-occupants of their land, some of which was acquired through purchase from the Mulla of Amanzai. They are Mohmand Sayyeds, being descended from Amanzai and Sahibzada.

The village is known as Shaghali Bala because it is built on an alluvium (tāpū) of the Shaghali Payan river. As mentioned above, the name is said to derive from the fact that there once many jackals (shaghal) in this region.

The village has been continuously inhabited since it was first established, and has never been dismantled or destroyed. It possesses no old barren land, and no hamlet.

The Pedigree Index shows that there are two Mohmand clans in the village, (1) Kandi Morcha Khel, and (2) Kandi Asaf Khel:-

(1)
Kandi Morcha Khel

Chohar Khan | Langar | Musali

(1) This kandi owns a total of 5 shares & 10 chittank.

(2)
Kandi Asaf Khel
Asaf Khel

Johan Khan

Masal | Tand

Kor Masal owns 1 share & 8 chittank

Kor Tand owns 8 chittank & 10 sarsahi

(2) This kandi owns a total of 2 shares, 4 chittank & 10 sarsahi.

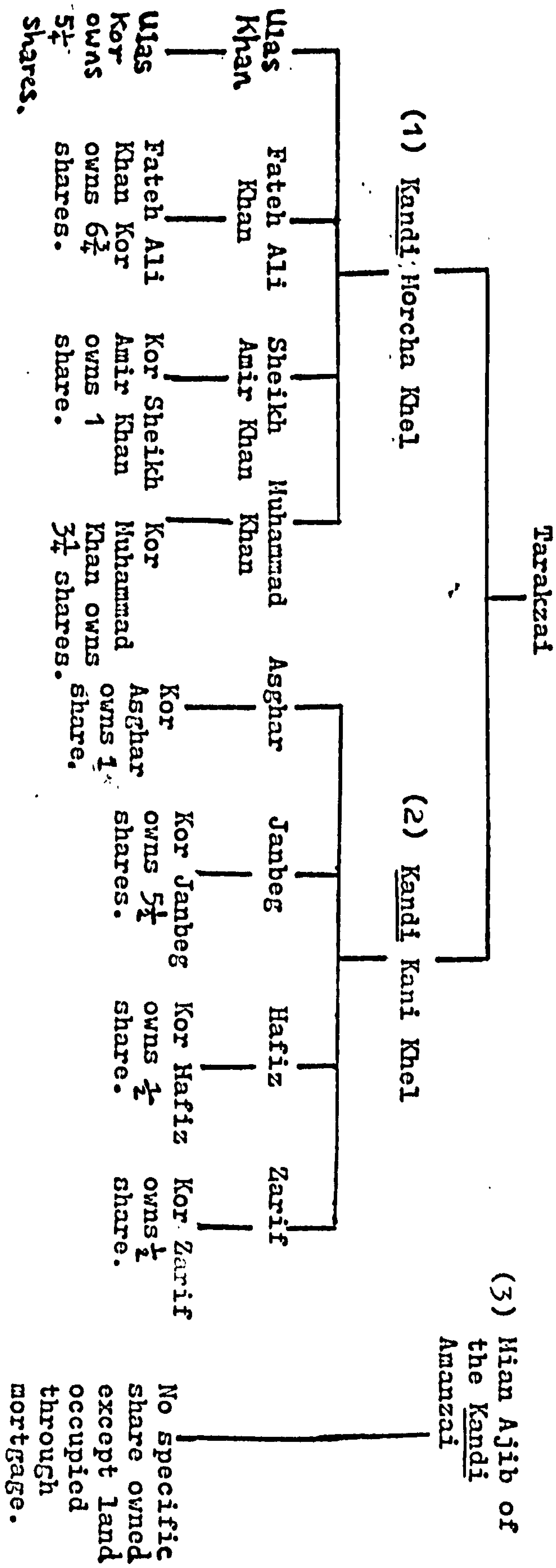
Ñilāvi

Details of ownership are given in the Pedigree Register. The village comprises 24 shares of land (out of 124 shares), which the present Mohmand inhabitants inherited from their forefathers. As descendants of Mian Ajib Baba of the Kandi Amanzai, they have had tax-free status since ancient times. Due to ancient tenure, they have also become owner-occupants of all the common land (shamilat) belonging to the village.

The village has always been known as Nilavi. The etymology of the name is uncertain. It is said that the name derives from nīlgar (dyer), because the village used to be inhabited by a large number of dyers.

The village has been continuously inhabited since it was first established. It has no old barren land, and no hamlet. The houses are dispersed in four places: Nilavi, Qila Janana, Qila Khalo Khan and Qila Said Mahd Khan.

The Pedigree Index shows that there are three Mohmand clans in the village, (1) Kandi Morcha Khel, (2) Kandi Kani Khel, and (3) Kandi Amanzai:-



(1) This kandi owns $16\frac{1}{4}$ shares.

(2) This kandi owns $7\frac{1}{2}$ shares.

(3) Miscellaneous, $\frac{1}{4}$ share.

Note: The total number of shares is 24.

Wazir Kali

The village comprises 24 shares of land (out of a total of 149 shares), distributed among the ancestors of the present inhabitants. The villagers are owner-occupants, being descendants of Saleh Muhammad and Shaikh Muhammad, who received the land from the common land of the village.

It is not known whether the village had an earlier name. It acquired its present name from the fact that the chieftains or maliks who first settled in this village had migrated from Wazir Kali in the region of Kabul.

The village was destroyed or deserted on several occasions due to the high-handedness of the Rulers of Lalbadar Wala. The houses are dispersed in six places: Jehangir Payan; Chargali; Wazir Kali; Jehangir Moza; Khatki; and Qila Gujar. There is no old barren land, nor is there any hamlet.

The Pedigree Index shows that there are three clans in the village, (1) Kandi Chahar Gula, (2) Kandi Wazir Kala, and (3) a miscellaneous kandi:-

(1) Kandi Chahar Gula

- (a) Ajab Khan of Daudzai Tribe
  - Kor Ajab Khel owns $2\frac{3}{4}$ shares.
- (b) Asaf Khan of Mohmand Tribe
  - Asaf Khel
    - Rawal
      - Kor Rawal owns $1\frac{1}{2}$ shares.
    - Abdul
      - Kor Abdul owns $\frac{1}{4}$ share.
    - Makh
      - Kor Makh owns 7 shares.

(1) This Kandi owns 9 shares.

(2) Kandi Wazir Kali

- Muradi Khan of Mohmand Tribe
  - Kor Muradi Khel owns 5 shares.
- Mansoor Khan of Mohmand Tribe
  - Kor Shah Mansoor Khel owns 6 shares.

(2) This Kandi owns 14 shares.

(3) Kandi Miscellaneous

- Saleh Muhammed of Afghan Wazir Tribe
- Ali Ahmed of Sayyed Tribe
  - These villagers own no land apart from 1 share given by the other Kandis.

(3) This Kandi owns only 1 share

Note: The total number of shares is 24.

Qila Shah Beg

The history of the village is given in the Pedigree Register. The village situated on the main road.

The name of the village derives from the fact that, before it existed, Shahbeg, an ancestor of the present inhabitants, built a fortress (qila) here for his protection. At that time silt deposited by the Adezai river formed an alluvium, on which Shahbeg's descendants built their houses. The fortress was demolished by the government, and no sign of it now remains.

The village is dispersed in five places. There is no old barren land, nor is there a hamlet.

The Pedigree Index shows that there are four clans in the village, (1) Kandi Nazar Kor, (2) Kandi Muradi Takhi, (3) Kandi Morcha Khel, and (4) Kandi Miscellaneous:-

(1)	(2)	(3)	(4)
Kandi Nazar Kor	Kandi Muradi Takhi	Kandi Morcha Khel	Kandi Miscellaneous
|	|	|	|
Nazar of Afghan Mohmand Tribe	Takhi of Afghan Mohmand Tribe	Jehangir Khan of Afghan MOrcha Khel Tribe	Members of Afghan Muradi Khel and Afghan Mian Khel
	|		
	Sarbadal		

Note: All four Kandis are owner-occupants, but no indication is given concerning the number of shares of land which they possess.

Gidar

Details of ownership are given in the Pedigree Register (Pargana Division). The land on which the village is situated originally fell to the lot of Aba Bakar Khan, from whom the present inhabitants are descended.

The village was once named Aba Khan, after the name of its founder. In the second generation, as a result of expansion and resettlement, the land was distributed among several descendants, and villages were established in each portion (Garhi Chandan, Khwaji, and so on). Later, Nazar Khan, who received 16 shares of village land together with the village itself, named it Gidar.

The reason why the village acquired this name is as follows. The ruler of the time chased and caught a jackal (gidar), which had taken refuge in the village fortress. He therefore named the village Gidar, and this name became well known.

The original site was threatened by flooding from the Naguman river, and the houses were reconstructed at a different place. But the village continued to be called Gidar.

The Pedigree Index shows that the villagers belong to one clan, Kandi Afghan Aba Khel:-

Aba Bakar Khan

Shahbaz Khan	Tazo Khan	Baharoonko
He built the village of Garhi Chandan, adjacent to Gidar.	He owns Gidar.	He built the village of Khwaji, and owns nothing in Gidar.

Note: No detailed Index was prepared for the Pedigree Register.

Khwaji

It was in the sixth generation that a certain Khan Zaman, whose kinship with the present inhabitants is given in the Pedigree Register, inherited this land and proceeded to occupy and inhabit it. It was then that Khwaji became detached from Gidar. One share of the land was later given by Ibrahim Khan to Sahib Jee, son of Mussamat.

It was proposed that the village be named Khwaji on account of the quality of the soil, which is saline and waterlogged. With the passage of time this name became well known.

The village is fully inhabited, and has never been deserted or demolished. The houses are situated in two places. There is no old barren land.

The Pedigree Index shows that, apart from a miscellaneous Kandi, the villagers belong to one clan, Kandi Afghan Aba Khol:-

Khan Zaman of Afghan Aba Khol

Tarooq

Shah Alam Khan

Shah Zaman

They own one share.

They own 7½ shares.

Note: The total number of shares is 8½.

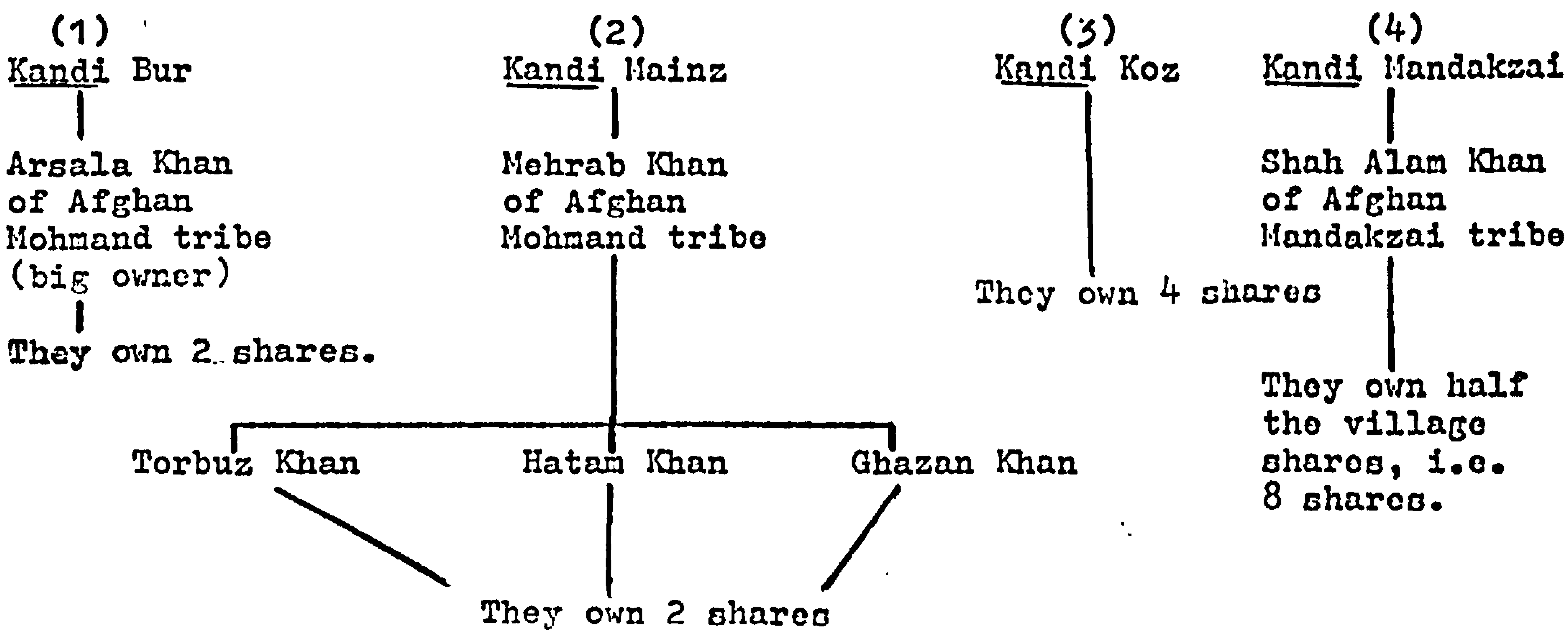
Dang Lakhta

The land on which the village is built was barren when it was settled by Mehrab Khan, to whom the Kor Asghar of the Afghan Mohmand tribe are related by direct line of descent. Mehrab Khan led his people here from the Mohmand Tribal Area during the reign of Taimur Shah. At that time Arsala Khan was the revenue officer of Lalpura in the Mohmand Agency. It is for this reason that in the Revenue Record the Khan of Lalpura is entered as the big landowner, while Mehrab Khan and his descendants are declared to be the small landowners, by order of 25 August 1874. Subsequently, some land belonging to the Mandakzai tribe became part of the village land due to a change in the direction of the Naguman river. It was thus that the village came to be included in the Revenue District of Mandakzai, and the ownership of this land was established.

As regards the name of the village, it is said that when the houses were being built, a channel was dug to bring water for construction purposes, and this channel was dug by means of wooden rods (_dang_); hence the village came to be known as Dang Lakhta.

Since its foundation the village has been devastated by floods on three separate occasions. The present village is the fourth to be built. There is no old barren land, nor is there a hamlet.

The Pedigree Index shows that there are four clans in the village, (1) _Kandi_ Bur (upper); (2) _Kandi_ Mainz (middle); (3) _Kandi_ Koz (lower); and (4) _Kandi_ Mandakzai:-



Note: The total number of shares is 16.

Piari Bala

The village has 12 shares of land received by the forefathers of the present inhabitants (out of a total of 149 shares). The villagers, who are Mohmands related to the Uthman Khel, Ajab Khel and Sayyed, have been free cultivators of the soil since the very beginning, and have been declared owner-occupants.

The origin of the name has already been mentioned in connection with Piari Payan. It is called Piari Bala to distinguish it from Piari Payan, which is situated further east.

The village was once washed away by a flood, and was reconstructed. Nobody from elsewhere owns land in the village, and there is no hamlet.

The Pedigree Index shows that there are three clans in the village, (1) *Kandi* Murad Khel; (2) *Kandi* Morcha Khel; and (3) *Kandi* Kani Khel:-

(1) *Kandi* Murad Khel
- Sarbadal
  - Muhammad — Kor Muhammad owns 3 shares.
  - Faraz — Kor Faraz owns 3 shares.
  - Nazar, Abdur Rab — Kor Nazar & Kor Abdur Rab own $\frac{3}{4}$ share.

(2) *Kandi* Morcha Khel
- Jehangir Khan — Kor Jehangir owns 1 share.

(3) *Kandi* Kani Khel
- Qasam
  - Asghar, Ghandal — Kor Asghar & Kor Ghandal own $\frac{3}{4}$ share.
  - Jan Beg — Kor Jan Beg owns $\frac{1}{2}$ share.
  - Hafiz — Kor Hafiz owns 2 shares.
  - Qabiz, Musam, Khwas, Nazar, Rohan — These five kors (households) own a total of $\frac{1}{2}$ share.

(1) This *kandi* owns $6\frac{3}{4}$ shares.

(2) This *kandi* owns 1 share.

(3) This *kandi* owns $4\frac{1}{4}$ shares.

Note: The total number of shares is 12.

Piari Payan

This village has 12 shares of land in the Michni area (out of a total of 149 shares). These shares were inherited by the heirs of Jehangir Khan of the Mohmand Morcha Khel, from whom most of the present inhabitants are descended. The Kani Khel and the Bukhari Sayyeds received some land on mortgage from Faiz Talab Khan of the Morcha Khel without any written receipt, and they eventually became owner-occupiers.

The village has always been known as Piari. The reason for its name is that a faqīr or holy man once lived here, who had a female slave working for him named Piari, and the village was named after her. It is called Piari Payan (lower) to distinguish it from Piari Bala, which is situated further west.

The village was once washed away by a flood and was reconstructed on the bank of the river. The houses are all located in one place, and there is no adjoining hamlet. Nobody from elsewhere owns land in the village.

The Pedigree Index shows that there are three clans in the village, (1) Kandi Mohmand Morcha Khel, (2) Kandi Mohmand Kani Khel, (3) Kandi Sayyed:-

(1)
Kandi Mohmand Morcha Khel
Jehangir Khan
Razi Khan   Raizi Khan   Zabar Dast   Zulfiqar

(2)
Kandi Mohmand Kani Khel
Miro   Saleh   Khan Gul   Mir Qadar

(3)
Kandi Sayyed
Sayyed Abdul Ghafooy

(1) This kandi once owned the whole village, i.e. 12 shares.

(2) and (3) These kandis own some land received on mortgage from Jehangir Khan.

Jogani

Details of ownership and pedigree are given in the Register prepared by the Revenue Department. The village is situated on alluvial land between two riverswhich was barren until Dilasar Khan, the forefather of the present occupants, worked on it and transformed it into cultivable land and built this hamlet.

It is called Jogani because, when the village was being built and the land was being prepared fot cultivation, one hut (jhogi) was erected.

Apart from the present occupants, nobody owns land in the village. The village is regarded by the tax collectors as a hamlet of Sarkhana, because it is not far away, and because some of the land lies in the Sarkhana Revenue District.

The Pedigree Index shows that the villagers belong to the Mohmand tribe, and are all descended from Dilasar Khan, whose next of kin was Oulas Khan. The village chief at the time when the index was prepared was Mughal Khan. Since there is no other kandi or khel in the village, the family tree has been omitted.

Sher Kali

The village has 12 shares of land which fell to the lot of Chohar Khan, a direct ancestor of the present inhabitants (when 144 shares of common land were distributed).

The villagers, Mohmands of Mian Khel and Mullan, became owner-occupants through cash purchase.

The village has always been known as Sher Kali. It was called this because the land where the village is situated was formerly inhabited by a tiger (sher).

The village was once destroyed by war during the Sikh régime, It was reconstructed when peace was restored, and since then has never been destroyed or deserted.

There is no old barren land, and no hamlet. The houses are all built on the same spot. Since there is no other kandi or khel in the village, the family tree has been omitted.

Bela Mohmandan

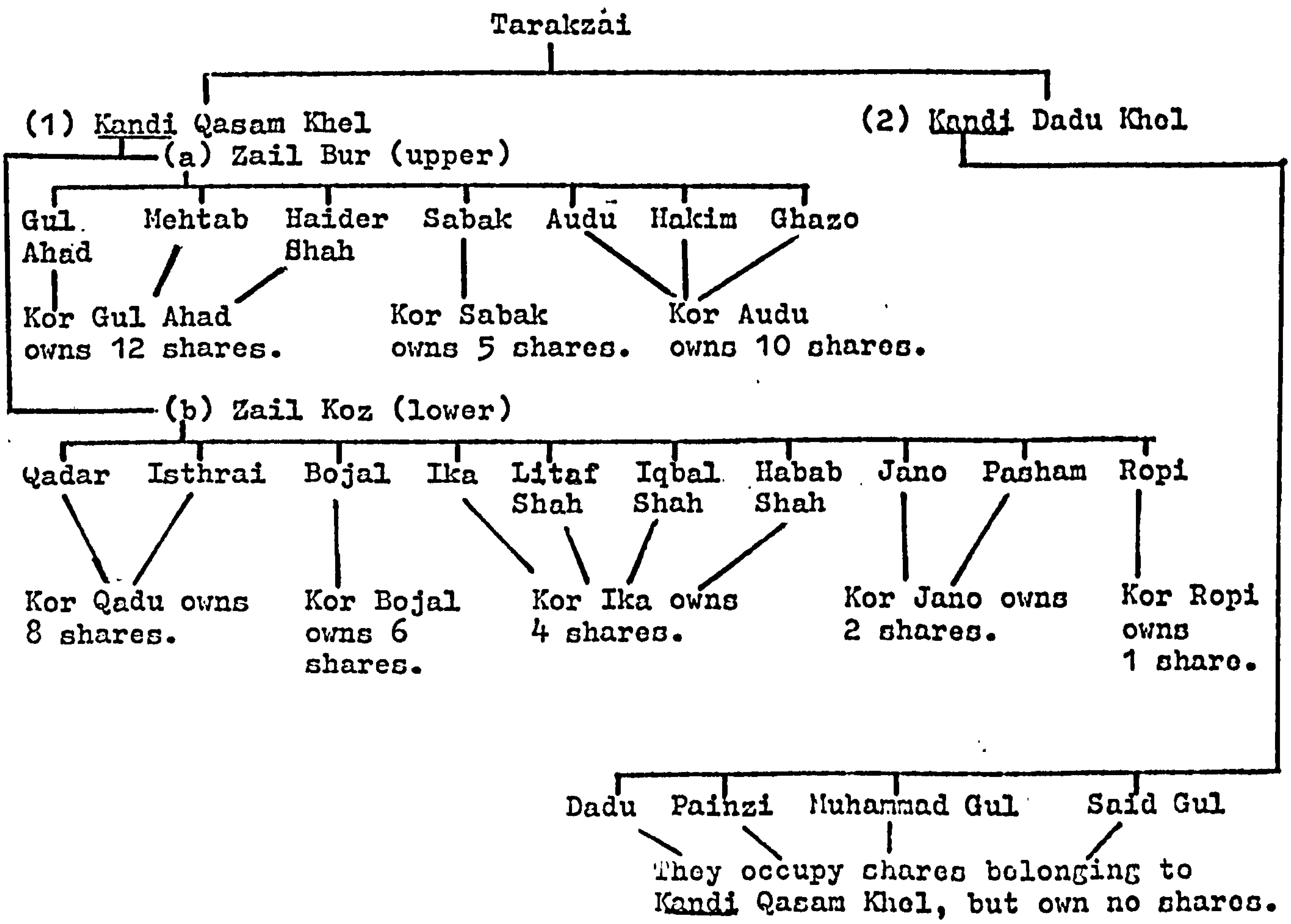
According to the Pedigree Register, this village is built oh land that originally fell to the lot of Tarakzai, from whom the present occupants claim descent. The villagers are members of the Daudzai and Mohmand tribes. They are owner-occupants, each household or kor having acquired land through purchase or inheritance.

The village is named Bela because it is situated on barren alluvial land (tāpū bela) between the Adzai and Naguman rivers. Since the inhabitants are of the Mohmand tribe, it came to be known as Bela Mohmandan.

The village has been destroyed several times since its foundation due to family feuds and punitive action on the part of the government. But each time the villagers returned to resettle the land.

There is no old barren land, and no hamlet. The houses are situated in two places.

The Pedigree Index shows that there are two clans in the village, (1) Kandi Qasam Khel, and (2) Kandi Dadu Khel:-



(1) Kandi Qasam Khel owns 48 shares (960 naghar). Of these 27 shares are owned by Zaid Bur and 21 shares by Zaid Koz.

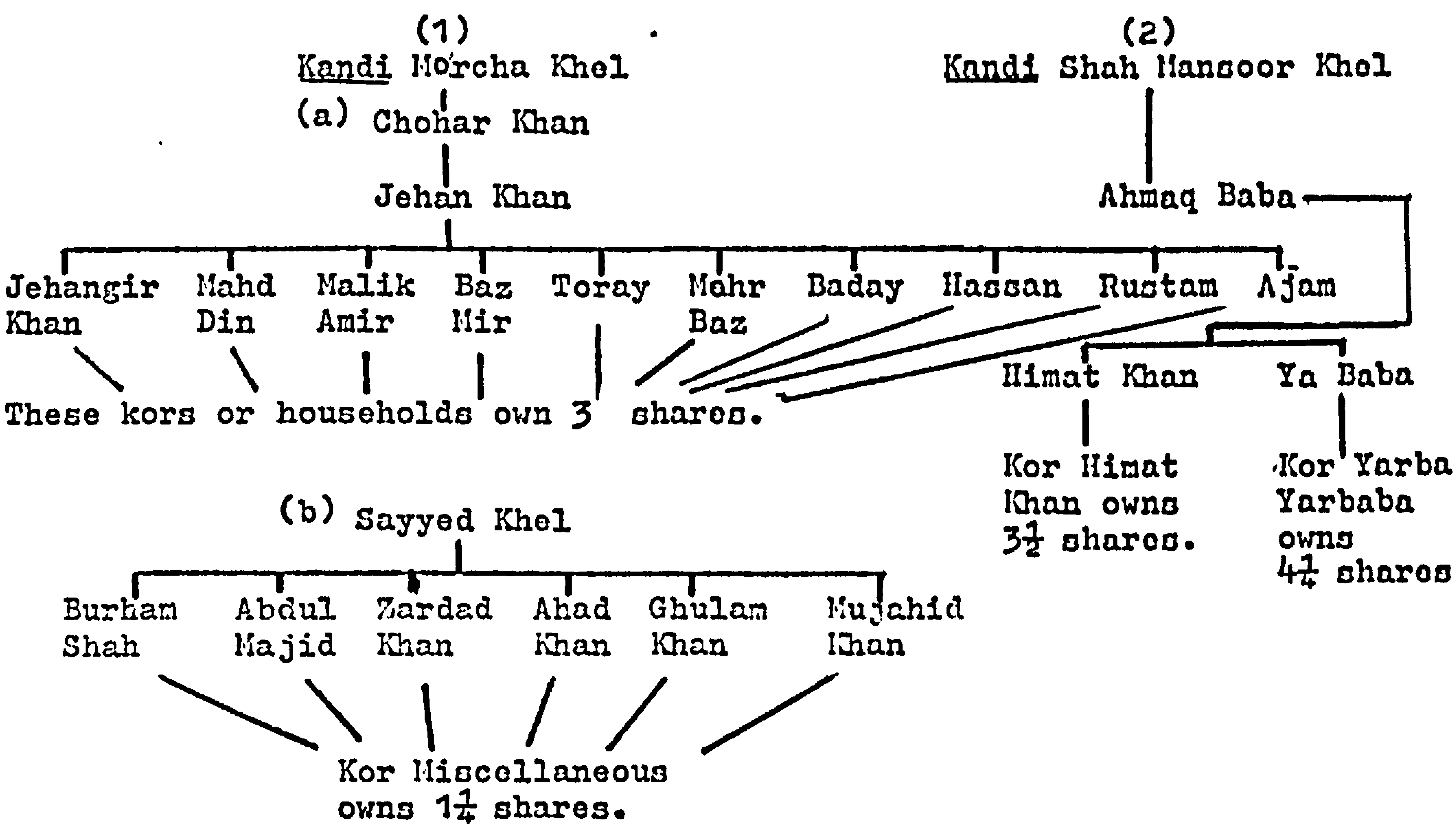
Dheri Kali

A detailed description of land ownership is given in the Pedigree Register. The village has 12 shares of land distributed (from a total of 144 shares) to Chohar Khan of Morcha Khel and Ahmaq Baba of Mansoor Khel, from whom most of the present inhabitants can trace their descent. The Sayyed and Mian Khel purchased their land from the Kandi Morcha Khel.

The origin of the village name is uncertain since it is very ancient. But it is said that it owes its name to the fact that where the houses now stand there were once big sand dunes.

The village has been deserted several times since its foundation due to wars, but it was always re-inhabited as soon as peace was restored. In recent years it has been continuously inhabited. There is no old barren land, and no hamlet.

The Pedigree Index shows that there are two Mohmand clans in the village, (1) Kandi Morcha Khel, and (2) Kandi Shah Mansoor Khel:-



(1) Kandi Morcha Khel owns 4¼ shares.

(2) Kandi Shah Mansoor Khel owns 7¾ shares.

Note: The total number of shares is 12.

Garhi Sharif Khan

The village lands were originally part of the shamilat or common land belonging to two villages: Dheri Sarwani and Ghar Lambak (situated on the canal). Sharif Khan, from whom most of the present occupants trace their ancestry, purchased the land from the occupants of the above-mentioned villages. The exact amount of the purchase is not known, and the revenue record is also missing. Sharif Khan built this village for his personal use and comfort, and named it after himself. Since then the village has been occupied by his descendants, who are members of the Mughal tribe.

The village of Garhi Sharif Khan was originally situated at Vesh Bandiala, but, for some reason, it was deserted after the death of the chief, and was rebuilt on an elevation one mile away known as Vandjabba. During the Sikh régime this village was deserted and destroyed as a result of warfare and looting. It was then rebuilt adjacent to Mandowna. However, it was difficult to administer the land from such a distant place. Six years ago (from the time when the Revenue Register was prepared) the villagers obtained government permission to establish the present village, and the village chief, Sayyed Ahmad Shah, was granted tax exemption by the then ruler. This chief rebuilt the village of Vandjabba and named it Garhi Saidan. During the Sikh régime, the village chief, Chiragh Shah, settled in a neighbouring district owing to a water shortage, and established a village in an irrigated place near the village of Dab. This village, which has never been deserted, is known as Chiragh Shah.

The two settlements are separated by a distance of one mile. There is no old barren land, and no hamlet. No remnants or signs remain of the old village site, which is now agricultural land. Nobody owns land in the village apart from the descendants of Garhi Sharif Khan and Garhi Chiragh Shah.

The Pedigree Index shows that there are two clans in the village, (1) Kandi Garhi Sharif Khan, and (2) Kandi Garhi Chiragh Shah:-

(1)
Kandi Garhi Sharif Khan

- Sharif Khan
  - first wife
    - Dost Muhammad Khan
    - Rehmat Ali
    - Saadat Ali Khan
  - second wife
    - Mir Ali Khan

(2)
Kandi Garhi Chiragh Shah

- Sayyed Ahmad Shah
  - Chiragh Shah

Note: No details are given concerning the number of shares of land and their distribution.

Bhattian

The big landowners are members of the Afghan tribe and descendants of Yahya Khan. The small landowners are members of the Hindki tribe, descended from Jeja and Abdallah.

Yahya Khan lived in the village of Isa Khel, and for this reason the lands of Bhattian used to belong to Isa Khel. Bhattian was separated from Isa Khel when Yahya Khan's son, Samad Khan, settled in the village.

Jeja and Abdallah of the Hindki tribe came from the village of Mewra. Samad Khan gave them permission to settle and offered them one third of the village land. A document was drawn up to this effect on 2 February 1862, signed by the Revenue Officer. A certain Gül Ahmad also became the owner-occupier of some common village land with the consent of the other landowners.

The village is named Bhattian because Samad Khan built an oven (bhattian) for public use.

The village has been continuously inhabited since its foundation. There is no old barren land.

The Pedigree Index shows that there are three clans in the village, (1) Kandi Afghan Gat Amanzai, (2) Kandi Auran Gat Pahti, and (3) Kandi Auran:-

(1) Kandi Gat Afghan Amanzai
Yahya Khan
Big landowners

(2) Kandi Auran Gat Pahti
Jeja

(3) Kandi Auran
Abdallah

Small landowners

Note: No details are given concerning the number of shares of land and their distribution.

Source: NWFP, 1883.

SEX DIFFERENTIALS IN MORTALITY A STUDY OF THE STATUS OF WOMEN IN PAKISTAN

HOUSEHOLD QUESTIONNAIRE

(For adult men and women over the age of 12)*

IDENTIFICATION

Tehsil .... Village .... Tribe ....
Sub-tribe ....
Khel ....

Interviewer's Name	Time ended
Date of Interview	Record of visits: 1 2 3 4 5 (Circle appropriate number)
Time started	Reason for noninterview (Specify)
Respondent's Name	

Section I. Structural, Occupancy & Economic Status of Household
(Check by Observation if possible)

1. Housing
   - Number of persons ....
   - Number of rooms ....
   - Number of beds ....

2. Walls
   (Tick appropriate line)
   - Brick/Stone/Cement ......
   - Mud ....
   - Other (Specify) ....

3. Floor
   - Cement/Stone ....
   - Dirt ....
   - Other (Specify) ....

4. Windows
   - Glass ....
   - Wood ....
   - None ....
   - Other (Specify) ....

5. Date of Construction
   - Year ....

6. Water Supply
   - Piped water (in/near house) ....
   - Public well ....
   - River/Stream ....
   - Other (Specify) ....

*Information on children should be obtained from the adults in the household.

7. Lighting

Electricity ....

Kerosene ....

Other (Specify)........................

8. Ownership Status

Owned ....

Rented (Cash) ....

Rent free ....

Other (Specify) ....

9. Ownership (Modern Objects)

Watch/Clock .... Others

Sewing Machine ....

Radio ....

Bicycle ....

10. Land Holding

	Owned	Held as tenant:
House & Garden	......	....
Irrigated Land	......	....
Non-Irrigated	......	....

11. Products (Amount)

Wheat.......... Tobacco............

Maize.......... S. Cane ....

Barley.......... Vegetables ....

Rice .... Fodder ....

Gram .... Other(Specify).....

....

....

12. Livestock

Buffalows ....

Cows ....

Goats ....

Sheep ....

Poultry ....

Others ....

13. Income/Expenditure

Total income (Annual) ....

Total expenditure (Annual) ....

Total credit (Annual) ....
source ____________

Purpose ____________

SECTION II. BASIC DEMOGRAPHIC CHARACTERISTICS

Col. of Respondents (If necessary use extra questionnaire)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Name (Family name first) List all persons who STAYED here last night, and all persons who USUALLY live here who are absent. INCLUDE infants under 1 year of age.													
2. Relationship to household head or other member example: son of 1 and 2													

CHARACTERISTICS	1	2	3	4	5	6	7	8	9	10	11	12
3. Residence Status Do you usually live here? Write Y - Yes N - No												
4. Sex Write M - Male F - Female												
5. Age How old were you on your last birthday? (If possible give date of birth: Day/Month/year)												
6. Place of Birth Where were you born? In this village In the Frontier Province Elsewhere(Specify)												
7. Marital Status Have you ever been married? Write Y - Yes N - No												
8. If yes, how many years have you been married? (If possible give date of marriage: Day/Month/year)												
9. At present are you Married Widowed Divorced Separated?												
10. Have you been married more than once? Write Y - Yes N - No												

SECTION III. FERTILITY AND MORTALITY CHARACTERISTICS

Widowhood												
1. Is your First husband/wife still alive? Write Y - Yes N - No												
2. If not, what was the cause of widowhood/widowerhood? Specify (Ask if wife died in childbirth)												

FERTILITY AND MORTALITY CHARACTERISTICS	Col. of Respondents 1	2	3	4	5	6	7	8	9	10	11	12	13
3. Orphanhood Is your father still alive? Write y - Yes N - No													
4. If not, what was the cause of his death? (Specify if possible)													
5. Are you the eldest living child of your father? Write Y - Yes N - No													
6. Is your mother still alive? Write Y - Yes N - No													
7. If not, what was the cause of her death? Childbirth Other (Specify)													
8. Are you the eldest living child of your mother? Write Y - Yes N - No													
9. Siblings How many brothers have you got who are still alive?													
10. How many of your brothers have died?													
11. How many sisters have you got who are still alive?													
12. How many of your sisters have died?													
13. Childhood Mortality and Fertility (Married women only) How many male children have you ever born who are still alive?													
14. How many of the male children that were born alive are now dead?													
15. What was the cause of their death? (Specify if possible)													

FERTILITY & MORTALITY CHARACTERISTICS	Col. of Respondents 1	2	3	4	5	6	7	8	9	10	11	12	13
16. How many female children have you ever born who are still alive?													
17. How many of the female children that were born alive are now dead?													
18. What was the cause of their death? (Specify if possible)													
19. Particulars of most recent birth What was the date (Day/Month/Year) of your last birth?													
20. Sex Write M - Male F - Female													
21. Is the child still alive? Write Y - Yes N - No													
22. If so, what was the cause of his/her death? (Specify if possible)													
SECTION IV. EDUCATION AND ECONOMIC ACTIVITY													
1. Schooling Have you ever been to school? Write Y - Yes No- No													
2. If yes, how many years were you at school?													
3. Can you read and write? Write Y - Yes N - No													

EDUCATION AND ECONOMIC ACTIVITY	col. of Respondents 1	2	3	4	5	6	7	8	9	10	11	12	13
4. Agriculture Are you an Owner non-Cultivator cultivator Tanant Cultivator Wage labourer Other (Specify)?													
5. Non agricultural Are you a Wage labourer unemployed Other (Specify)?													
SECTION V. HEALTH/FAMILY PLANNING AND PREGNANCY													
1. Treatment When you were last ill? where did you seek treatment? Did nothing Traditional healer Hospital/Health Centre Other (Specify)													
2. How much did you pay for the treatment?													
3. What was the nature of your illness?													
4. Have you ever had T.B. Write Y-Yes N-No													
5. Have you ever been vaccinated? Write Y - Yes N - No													
6. If yes, state type of vaccination. (Tick one or more). Smallpox T.B. Cholera Typhoid Other (Specify)													
7. Family Planning Have you heard of any methods of avoiding pregnancy? Write Y - Yes N - No													

HEALTH/FAMILY PLANNING/ PREGNANCY	Col. of Respondents 1	2	3	4	5	6	7	8	9	10	11	12	13
8. If yes, have you used any of the following? (Tick one or more) Pill IUD Condom Rhythm Abstinence Other(Specify)													
9. Where do you obtain contraceptives? Shop Dai Hospital Other(Specify)													
10. Pregnancy (Married Women) Where was your last child born? Home Hospital Other place (Specify)													
11. Who attended the birth? Trained Midwife Dai Other(Specify)													
12. Did you breastfeed your most recent child? Write Y - Yes N - No													
13. If yes, how many months have you breastfed the child?													
14. If you are still breast feeding, how many more months do you intend to continue?													
15. At what age do you begin to wean your male children?													

HEALTH/FAMILY PLANNING/ PREGNANCY	Col. of Respondents 1	2	3	4	5	6	7	8	9	10	11	12	13
16. At what age do you begin to wean your female children?													
17. Are you pregnant now? Write Y - Yes N - No													
18. If yes, when is the baby due? (Month/Year)													
19. How many more boys would you like to have?													
20. How many more girls would you like to have?													

Comments by interviewer.

APPENDIX 6: A LIST OF HOUSEHOLDS.

Bhattian

1 Taj Mohd
2 Nur Said
3 Haji Mohibullah
4 Habibullah
5 Khalilur Rehman
6 Awal Khan
7 Manwar
8 Nadir Khan
9 Haji Saif Gul
10 Abdul Wadood
11 Shah Khel
12 Abdul Jalil
13 Gul Rehman
14 Gul Zaman
15 Nawaz Khan
16 Mirza Gul
17 Shaibullah
18 Hameesh Gul
19 Sanobar
20 Mir Akbar
21 Mohd Ayub
22 Abdul Karim
23 Mir Aslam
24 Ali Khan
25 Faqir Mohd
26 Khitab Gul
27 Hayat Gul
28 Amir Nawaz
29 Sher Mohd
30 Sherzaman Khan
31 Shahbaz Khan
32 Mir Abas Khan
33 Sulab Din
34 Mohd Yaqoob
35 Saiful Malook
36 Mohd Anwar
37 Mohd Junaid
38 Amir Mohd
39 Jar Mohd
40 Fazli Rabi
41 Noor Mohd
42 Mohd Rafiq
43 Ghanieur Rehman
44 Habib Gul
45 Zafar Khan
46 Abdus Sattar
47 M. Abdur Rab
48 Gul Khan
49 Sherin
50 Khaista Gul
51 Hukmat Khan
52 Nasrullah
53 Shakar
54 Bahadur Sher
55 Gulis Akbar
56 Abdul Khaliq
57 Mahabat Khan
58 Sherin
59 Abas Khan
60 Abdul Majid
61 Lajber
62 Nishan Khan
63 Umar Gul
64 Mohd Akber
65 Rahim Gul
66 Sharif Gul
67 Shahzada
68 Dad Mir
69 Saifur Rehman
70 Abdul Qaher
71 Fazli Subhan
72 Ghulam Nabi
73 Lal Mohd
74 Faiz Mohd
75 Sher Ali
76 Taj Mohd
77 Habib Khan
78 Abdul Malik
79 Farmanullah
80 Janat Gul
81 Gul Din
82 Toray
83 Lajber-2
84 Taj Mohd-2
85 Ahmed Khan
86 Abdul Ghafar
87 Fateh Khan
88 Abdul Wahid
89 Musafar-Ghazi
90 Momien
91 Noor Gul
92 Gazi Mohd Khan
93 Hanifullah (Malana)
94 Gul Badshah
95 Sarafa
96 Jaffar

Zahir ... Baran

Hasta Khan ~~Khaista~~ 97 - Hasta ~~Aziz~~ Khan
98 - Sahib Gul
99 - Nazir Gul
100 - Mahaidin
101 - Khanim~~ullah~~
102 - Najab
103 - Maulana Jamshed
104 - Gul Rahim
105 - Ikramuddin
106 - Taza Gul
107 - Sanober-2
108 - Latif
109 - Wasal
110 - Azam Khan
111 - Maulana Shah Afzal
112 - Rostum
113 - Nasrullah-2
114 - Haji Madad
115 - Mahmood
116 - Shah Khel
117 - Sardar
118 - Mahd Rashid
119 - Khan Sher
120 - Daray Khan
121 - Ajab Khan
122 - Raza Khan
123 - Noor Hasan
124 - Gulber
125 - Dahshat
126 - Samin
~~Shamin~~

127 - Waris
128 - Lal Mohd
129 - Yaqoob
130 - Mahib Gul
131 - Habibullah
132 - Kach Kool
133 - Taj Gul
134 - Abdur Rashid
135 - Laheem Khan
136 - Gulbaray
137 - Hastam Awan
138 - Mohd Yousif
139 - Qasam
140 - Najab
141 - Rajab
142 - Abdur Rashid-2
143 - Shamshed Qamar
144 - Shahzad Gul
145 Noor Ali.
146 - Saiful Maluk
147 Shah Afzal
148 Faqir Mohd
149 Shalim
150 - Damin
151 Shah Khel.
152 Habib Khan
153 Gul Khan
154 Rasul Khan

APPENDIX 7: CODING FORMS AND CODES

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General Coding Form

General

4	Serial number
2	Village number
1	Economic category
1	Tribe
2	Subtribe
2	Khel
1	Interviewer
2	Hour started
2	Minute started
1	Sex of respondent
2	Hour of finish
2	Minute of finish
2	No. of persons
2	No. of rooms
2	No. of beds
1	Walls
1	Water
1	Ownership status
1	Ownership mod. obj.
2	House(acres)
2	Owned irrig. land
2	Rented irrig. land
3	Unirrigated land
3	Wheat(amount)
3	Maize(amount)
3	Sugar Cane(amount)
3	Other(fodder)
1	Buffalow(no.)
1	Cows(no.)
1	Goats/sheep(no.)
1	Oxen(no.)
3	Income amount(00's)
3	Expenditure(00's)
3	Credit(00's)
2	Source
2	Purpose
1	Family type
2	Month of interview
2	Year of interview
2	Card number

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INDIVIDUAL FORM.

Serial-Number
Relation to Head
Residence status
Sex
Age
Birth place
Marital status
Years of marriage
Present marital st.
Married once/more
Spouse Alive/Dead
Cause of death
Father Alive/Dead
Cause of death
Eldest of Father
Mother Alive/Dead
Cause of death
Eldest of mother
Brother(r) alive
Brother(r) dead
Sister(r) alive
Sister(r) dead
M children ever borne still alive
M children ever borne now dead
Cause of death(I)
Cause of death(2)
F children ever borne still alive
F children ever borne now dead
Cause of death(I)
Cause of death(2)
Month of last birth
Year of Last birth
Sex of child
Alive/Dead
Cause of death
Schooling(Years)
Read/Write
Profession
Place of treatment
Amount Paid
Nature of Illness
T.B.
Vaccination
F.P. heard of
Use of F.P.
Source
Place child born
Attended by
Months breastfed( )
breastfed( )
Card No.

GENERAL

1. Tribe: 1=Mohmand
2=Daudzai + Other

2. Subtribe:
1=Afghan
2=Awan
3=Mughal
4=Mullan/Mullian
5=Qandaray
6=Saidan/Said/Sayyad
7=Masood
8=Badar
9=TARAKZAI
10=Alemzai/Halimzai
11=Barbar(Hajam)
12=Batarian
13=Jilani(Pir)
14=Mian Agib Khel(Mianjib),Mia
15=Shah Khel
16=Tarkan(carpenter)
17=Utman
18=Other

3. Khel:
1=Aba khel
2=Mulla/Mula
3=Kamal
4=Mianjib/Mia
5=Akil/Akal
6=Akundzad Gan(Akun Zadgan)
7=Ashe
8=Asghar
9=Asraff
10=Bamiri
11=Badla
12=Bajal
13=Babian
14=Baro/Baso
15=DADU
16=Durrani
17=Doo
18=Habibzai
19=Hafiz
20=Isa
21=Idar
22=Khalil
23=Khushe
24=Kado
25=Muradey(Maradi)
26=MORCHA
27=Mia/Miajan/Miajib
28=Maulns
29=Misal
30=Maroof
31=Nazar
32=QASIM/KASIM
33=Rasak
34=Raval
35=Saidan/Said
36=Sali
37=Ser Bedel/Sharbadal
38=Shekan
39=Shemeser
40=Tull
41=Tan
42=Tajik
43=UTMAN
44=WAZIR
45=ZARIF
46=Zargar/Zargaran
99=Others

INTERVIEWER: 1=A.A.(Aisha Ahmad)
2=FS(Feroz Shah)
3=Tahir
4=Others

RESPONDENT'S SEX: 1=Male
2=Female

(Only for AA check whether male or female by looking at sex. For others always male).

WALLS: 1=Mud
2=Cement

WATER: 1=Own well
2=Other well
3=River/Stream + Other well
4=Piped Water

OWNERSHIP STATUS:
1=Owned
2=Rented

OWNERSHIP MODERN OBJECTS: 1=Yes(any)
2=No

HOUSE: To nearest Kanal i.e. if ½ kanal put 1 and next time if 1½ put 1 to even out.

IRRIGATED/UNIRRIGATED: To nearest ACRE. If written jb(jirab) convert to acres 2jb=1acre.

PRODUCTS: In maunds.

S.Cane: Convert to molasses(ghur). If 130md s.g.=13md ghur
10md =1md

INCOME/EXPD/CREDIT(IN 00'S): If 15000 put 150

SOURCE OF CREDIT

1=Artis
2=Bank
3=Friends
4=Govt
5=Land Mortgaged
6=Moneylender
7=Moneylender + Friends
8=Other Villagers
9=Relatives
10=Landlord
11=Shopkeeper
12=Others

PURPOSE OF CREDIT

1=Business
2=Bullocks, Buffalows(Purchase of farm aminals)
3=Criminal Suit
4=Children's education
5=Death(Father/Mother etc)
6=Food, clothing, medicine
7=Fertilizer, Agriculture
8=Illness
9=House Construction
10=Land Improvement
11=Land Purchase
12=Marriage
13=Others

FAMILY TYPE:
1=NUCLEAR
2=EXTENDED LINEAR
3=EXTENDED COLLATERAL

INDIVIDUAL FORM CODES

I. Serial No.		
2. Relation to Head		I=Head 2=Wife 3=Sons 4=Daughters 5=Mother 6=Father 7=Daughter in-law 8=Grandson 9=Granddaughter IO=Brothers 11 Sisters. 12 Nephew 13 Niece 14=Grandmother 15=Wife of Household head's brother 16=Mother-in-law 17=Sister-in-law 18=Uncle 19=Aunt 20=Others
3. Residence		1=Yes 2=No
4. Sex		1=Male 2=Female
5. Age	List age(ool-140)	
6. Birth Place		1=This village 2=Other Village
7. Marital status		1=Ever married 2=Never married

8. Years of marriage: List total years

9. Present Marital status: 1=Married
2=Widowed
3=Divorced

10. Married more than once: 1=Yes
2=No

11. Spouse: 1=Alive
2=Dead

12. Causes of death
1= Accident(drowned, shock by bull etc)
2= Appendicitis
3= Asthma
4= Blood pressure/Heart trouble
5= Burns,Bites(snake,dog)
6= Cold/Fever/Cough
7= Childbirth
8= Cholera
9= Cancer
10= Diarrhoea/Vomiting
11= Eyes/Nose/Throat
12= Epilepsy
13= Falaj(Paralysis)
14= Female disease(gynaecological complaints)
15= Illness
16= Infection
17= Jaundice
18= Malaria
19= Mental Illness
20= Murdered(Other deaths of violence)
21= Pneumonia/Fever
22= Piles
23= Rheumatism(Bad)
24= Skin(Boils etc.)
25= Smallpox
26= Stomach complaints
27= Shinwalay
28= Spirits(evil spirits)
29= T.B.
30= Typhoid
31= Urine Stoppage
32= Worms
33= Old age
34= Natural death
35= Childhood/ After birth
36= Stillbirth
99= Not known

13. Father 1=Alive
2=Dead

14. Causes: See above for causes

15. Eldest of Father: 1=Yes
2=No

16. Mother: 1=Alive
2=Dead

17. Causes: See above for causes

18. Eldest of Mother 1=Yes
2=No

19. Brothers(real=r) alive: List number

20. Brothers(r) dead: List number

21. Sisters(r) alive: List number

22. Sisters(R) dead: List number

23. Male(M) children ever borne still alive: List no.
24. M children ever borne now dead. List no.
25. Causes:See above(1)death of 1st; (2)death of 2nd

26. Female(F) children ever borne still alive: List number

27. F. children ever borne now dead: List number

28. Causes of death: See above for causes

29. Month of last birth: 01-12

30. Year of last birth 46....or 76

31. Sex: 1=Male
2=Female

32. Child 1=Alive
2=Dead

33. Causes: See list above for causes

34. Schooling: List number of years.

35. Literacy: 1=Yes
2=No

36. Profession: 1=Owner cultivator(OC)
2=Owner Non-cultivator(ONC)
3=Tenant
4=Wage labourer
5=Carpenter, barber(trades)
6=Shopkeeper(business)
7=Govt. service
8=Unemployed
9=Other (Mullah, Imam etc.)

37. Place of treatment: 1=Doctor
2=Compounder
3=Hospital
4=Health Centre
5=Traditional Hakim(doctor)
6=Ziarat
7=Self treatment
8=No treatment
9=Other

38. Amount Paid: List amount

39. Causes of illness

1= Accident(drowned, shock by bull etc)
2= Appendicitis
3= Asthma
4= Blood pressure/Heart trouble
5= Burns,Bites(snake,dog)
6= Cold/Fever/Cough
7= Childbirth.
8= Cholera
9= Cancer
10= Diarrhoea/Vomiting
11= Eyes/Nose/Throat
12= Epilepsy
13= Falaj(Paralysis)
14= Female disease(gynaecological complaints)
15= Illness
16= Infection
17= Jaundice
18= Malaria
19= Mental Illness
20= Wounds caused by violence
21= Pneumonia/Fever
22= Piles
23= Rheumatism(Bad)
24= Skin(Boils etc.)
25= Smallpox
26= Stomach complaints
27= Shinwalay
28= Spirits(evil spirits)
29= T.B.
30= Typhoid
31= Urine Stoppage
32= Worms
33= No illness
34= Other
99= Not known/ Do not remember

40. T.B. 1=Yes
2=No

41. Vaccination 1=Yes
2=No

42. Heard of Family Planning: 1=Yes
2=No

43. Use of Family P: 1=Yes
2=No

44. Source: 1=Shop
2=Dai(local midwife)
3=Hospital
4=Lady Health Visitor
5=F.P. Centre 6=Other

45. Birth of child: 1=Home
2=Hospital
3=Other

46. Attended by: 1=Doctor
2=Trained Midwife
3=Dai(Local)
4=Relatives /Other woman
5=Other

47. Years of Breastfeeding(Male). Check if last child male and see how many years breastfed.

48. Years of breastfeeding Female: State years.

49. Card Number: For the individual forms the card number always begins with 02, because General is 01

Example Indivdual	information on	Head	02
"	"	Wife	03
"	"	Son	04

and so on

APPENDIX 8: A SAMPLE OF COMPUTER ERRORS

```
SERIAL NUMBER   16 DOES NOT START WITH CARD NUMBER 02 SEE LINE  1119 CHECK YOUR DATA+++++++++++
SERIAL NUMBER  164 CARD NUMBER  7 IS MISSINGFROM YOUR FILE.
SERIAL NUMBER  195 DOES NOT START WITH CARD NUMBER 02 SEE LINE  1335 CHECK YOUR DATA+++++++++++
SERIAL NUMBER  204 CARD NUMBER  2 IS DUPLICATED IN YOUR FILE.
IT APPEARS ON LINES  1420 AND  1429
SERIAL NUMBER  204 CARD NUMBER  3 IS DUPLICATED IN YOUR FILE.
IT APPEARS ON LINES  1421 AND  1430
SERIAL NUMBER  204 CARD NUMBER  4 IS DUPLICATED IN YOUR FILE.
IT APPEARS ON LINES  1422 AND  1431
SERIAL NUMBER  204 CARD NUMBER  5 IS DUPLICATED IN YOUR FILE.
IT APPEARS ON LINES  1423 AND  1432
SERIAL NUMBER  204 CARD NUMBER  6 IS DUPLICATED IN YOUR FILE.
IT APPEARS ON LINES  1424 AND  1433
SERIAL NUMBER  251 CARD NUMBER  3 IS DUPLICATED IN YOUR FILE.
IT APPEARS ON LINES  1735 AND  1740
SERIAL NUMBER  251 CARD NUMBER  8 IS MISSINGFROM YOUR FILE.
SERIAL NUMBER  467 CARD NUMBER  7 IS MISSINGFROM YOUR FILE.
SERIAL NUMBER  467 CARD NUMBER  9 IS DUPLICATED IN YOUR FILE.
IT APPEARS ON LINES   417 AND   419
SERIAL NUMBER  491 CARD NUMBER  2 IS DUPLICATED IN YOUR FILE.
IT APPEARS ON LINES   556 AND   563
SERIAL NUMBER  491 CARD NUMBER  7 IS MISSINGFROM YOUR FILE.
SERIAL NUMBER  499 CARD NUMBER  6 IS DUPLICATED IN YOUR FILE.
IT APPEARS ON LINES   605 AND   633
SERIAL NUMBER  499 CARD NUMBER  6 IS MISSINGFROM YOUR FILE.
SERIAL NUMBER  512 CARD NUMBER  3 IS DUPLICATED IN YOUR FILE.
IT APPEARS ON LINES   725 AND   730
SERIAL NUMBER  512 CARD NUMBER  8 IS MISSINGFROM YOUR FILE.
SERIAL NUMBER  520 CARD NUMBER  3 IS DUPLICATED IN YOUR FILE.
IT APPEARS ON LINES   788 AND   832
SERIAL NUMBER  529 CARD NUMBER  3 IS MISSINGFROM YOUR FILE.
SERIAL NUMBER  529 CARD NUMBER  4 IS MISSINGFROM YOUR FILE.
SERIAL NUMBER  534 CARD NUMBER  4 IS MISSINGFROM YOUR FILE.
SERIAL NUMBER  537 CARD NUMBER  4 IS DUPLICATED IN YOUR FILE.
IT APPEARS ON LINES   808 AND   893
SERIAL NUMBER  550 CARD NUMBER 11 IS MISSINGFROM YOUR FILE.
SERIAL NUMBER  675 DOES NOT START WITH CARD NUMBER 02 SEE LINE     1 CHECK YOUR DATA+++++++++++
SERIAL NUMBER  876 DOES NOT START WITH CARD NUMBER 02 SEE LINE     2 CHECK YOUR DATA+++++++++++
SERIAL NUMBER 1521 DOES NOT START WITH CARD NUMBER 02 SEE LINE   797 CHECK YOUR DATA+++++++++++
SERIAL NUMBER 1529 DOES NOT START WITH CARD NUMBER 02 SEE LINE   833 CHECK YOUR DATA+++++++++++
```

LIST OF FAILED RECORDS 02/06/76 PAGE 1

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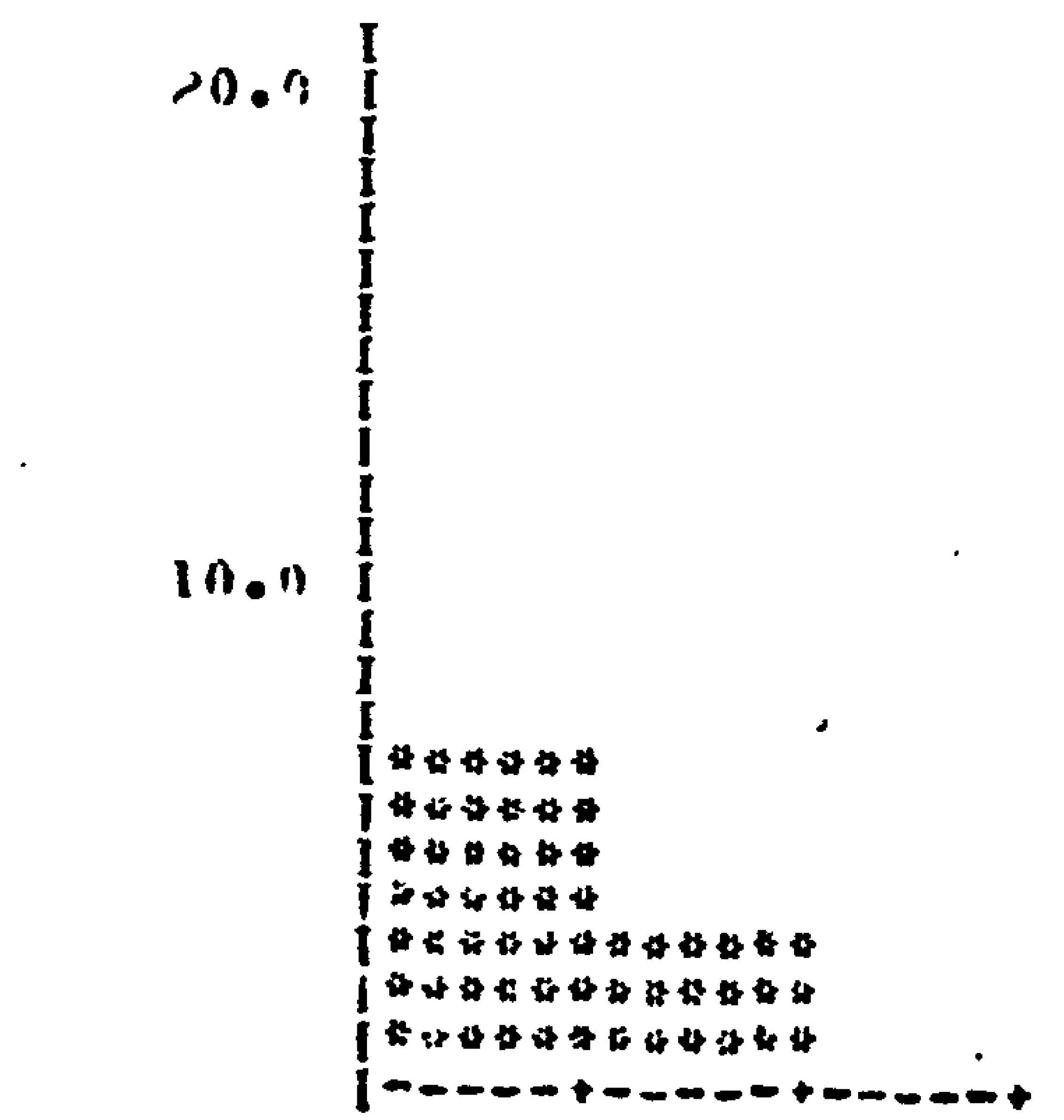
ORDINAL	SERIAL NUMBER	ERROR MESSAGE	VARIABLE(S)	VALUE(S)	
9	477 3	CAUSES DEATH CHILD	35 VAR35	0.	col 46
16	479 6	CAUSE DEATH SON SONS DEAD	25 VAR25 24 VAR24	0. 1.0000	col 41. 99
~~25~~	~~480 2~~	~~PLACE TREATMENT~~	~~39 VAR39~~	~~2.0000~~ ✓	
37	481 4	MOTHER DEAD OR ALIVE MOTHER ALIVE	16 VAR16 16 VAR16	0. 0.	col 25=1
38	481 5	MOTHER DEAD OR ALIVE MOTHER ALIVE	16 VAR16 16 VAR16	0. 0.	col 25=1
39	481 6	MOTHER DEAD OR ALIVE MOTHER ALIVE	16 VAR16 16 VAR16	0. 0.	col 25=1
40	481 7	MOTHER DEAD MOTHER ALIVE	17 VAR17 16 VAR16	0. 2.0000	col 25=1
41	481 8	MOTHER DEAD MOTHER ALIVE	17 VAR17 16 VAR16	0. 2.0000	col 25=1
42	481 9	MOTHER DEAD MOTHER ALIVE	17 VAR17 16 VAR16	0. 2.0000	col 25=1
124	493 7	NO MARRIAGE CODE NOT MARRIED NOT MARRIED	7 VAR7 7 VAR7 7 VAR7	0. 0. 0.	col 13=2
129	496 4	FATHER DEAD FATHER ALIVE	14 VAR14 13 VAR13	0. 2.0000	col 21=1
130	495 2	MOTHER DEAD MOTHER ALIVE	17 VAR17 16 VAR16	0. 2.0000	col 26= 99
134	430 3	CAUSE DEATH SON SONS DEAD SONS DEAD	25 VAR25 24 VAR24 24 VAR24	0. 3.0000 3.0000	col 41= 3535
167	433 3	ELDEST MOTHER	18 VAR18	3.0000	col 27 ...
175	434 8	RELATIONSHIP NOT MALE	2 VAR2	4.0000	col 1= 2
183	436 3	CAUSE DEATH DAUGHTER DAUGHTERS DEAD	29 VAR29 28 VAR28	0. 1.0000	col 49. 99
188	436 4	T.M.	42 VAR42	3.6000	col 70= 2 - (x)
203	438 7	SPOUSE DEAD	12 VAR12	0.	col 19= 99
~~209~~	~~440 4~~	~~AGE OUT~~	~~5 VAR5~~	~~100.00~~	
216	440 14	MOTHER DEAD MOTHER ALIVE	17 VAR17 16 VAR16	0. 2.0000	col 26= 99
~~229~~	~~442 2~~	~~YRS SCHOOL PLACE TREATMENT~~	~~36 VAR36 39 VAR39~~	~~0. 2.0000~~ ✓	
234	443 7	FATHER DEAD FATHER ALIVE	14 VAR14 13 VAR13	0. 2.0000	col 21= 99
239	446 3	SONS DEAD	24 VAR24	2.0000	col 43. 38
244	450 1	CAUSE DEATH SON SONS DEAD	25 VAR25 24 VAR24	0. 1.0000	col 39.00
293	451 3	CAUSE DEATH SON SONS DEAD SONS DEAD	25 VAR25 24 VAR24 24 VAR24	0. 3.0000 3.0000	col 41= 3535
321	454 9	MOTHER DEAD MOTHER ALIVE	17 VAR17 16 VAR16	0. 2.0000	col 26. 99
~~328~~	~~455 7~~	~~YEARS MARRIAGE WRONG~~	~~8 VAR8~~	~~44.000~~ ✓	
331	456 4	DAUGHTERS DEAD	28 VAR28	2.0000	col 51= 28
334	456 11	CAUSES DEATH CHILD	35 VAR35	0.	col 59= 15
309	461 3	FATHER DEAD FATHER ALIVE	14 VAR14 13 VAR13	0. 2.0000	col 22= 99
369	~~461 6~~	~~YEARS MARRIAGE WRONG~~ MOTHER DEAD MOTHER ALIVE	~~8 VAR8~~ 17 VAR17 16 VAR16	~~44.000~~ ✓ 0. 2.0000	col 26= 99
~~370~~	~~462 3~~	~~RELATIONSHIP NOT MALE~~	~~2 VAR2~~	~~4.0000~~ ✓	
385	464 4	PRESENT MARITAL STATUS MARITAL STATUS OUT	9 VAR9 9 VAR9	7.0000 7.0000	col 16=1 (x) ✓
387	464 6	FATHER DEAD FATHER ALIVE	14 VAR14 13 VAR13	0. 2.0000	
388	466 7	FATHER DEAD FATHER ALIVE	14 VAR14 13 VAR13	0. 2.0000	
411	466 15	FATHER DEAD FATHER ALIVE	14 VAR14 13 VAR13	0. 2.0000	col 22=01
432	469 6	LITERACY	37 VAR37	0.	col 63= 2
466	474 6	FATHER DEAD FATHER ALIVE	14 VAR14 13 VAR13	0. 2.0000	col 22= 99
481	476 4	RELATIONSHIP CODE OUT RELATIONSHIP NOT FEMALE HEAD OF HOUSEHOLD	2 VAR2 2 VAR2 2 VAR2	64.000 64.000 64.000	col 5= 04 (x) ✓
494	479 3	DAUGHTERS DEAD	28 VAR28	2.0000	col 51= 35
535	485 7	RELATIONSHIP NOT MALE FEMALE MARRIED FEMALE MARRIED FEMALE MARRIED FEMALE MARRIED FEMALE MARRIED	2 VAR2 4 VAR4 4 VAR4 4 VAR4 4 VAR4 4 VAR4	3.0000 1.0000 1.0000 1.0000 1.0000 1.0000	col 1= 2 (x) ✓
538	488 4	FATHER DEAD FATHER ALIVE	14 VAR14 13 VAR13	0. 2.0000	col 22= 99
559	491 3	PLACE TREATMENT	39 VAR39	2.0000	col 64=1
568	492 3	T.M.	42 VAR42	0.	col 70= 2
591	490 6	NO BROTHERS DEAD OUT PLACE TREATMENT	20 VAR20 39 VAR39	10.000 2.0000	col 31= 00 (x)
615	490 6	RELATIONSHIP NOT MALE	2 VAR2	7.0000	col 6= 2
621	496 12	FATHER DEAD FATHER ALIVE	14 VAR14 13 VAR13	0. 2.0000	col 22= 33
~~634~~	~~499 7~~	~~RELATIONSHIP NOT MALE~~	~~2 VAR2~~	~~4.0000~~ ✓	
642	500 3	NO SISTERS ALIVE OUT	21 VAR21	12.000	col 33= 02 (x)
649	500 10	NO BROTHERS DEAD OUT	20 VAR20	11.000	col 31= 01 (x)
655	501 4	YRS SCHOOL	36 VAR36	0.	col 61= 6
660	501 9	FEMALE MARRIED FEMALE MARRIED FEMALE MARRIED FEMALE MARRIED FEMALE MARRIED FEMALE MARRIED	4 VAR4 4 VAR4 4 VAR4 4 VAR4 4 VAR4 4 VAR4	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	col 8= 2
673	503 7	MOTHER DEAD MOTHER ALIVE	17 VAR17 16 VAR16	0. 2.0000	col 26= 99
679	505 3	FATHER DEAD FATHER ALIVE	14 VAR14 13 VAR13	0. 2.0000	col 22= 99
689	506 5	NOT MARRIED NOT MARRIED NOT MARRIED	7 VAR7 7 VAR7 7 VAR7	1.0000 1.0000 1.0000	col 4= 01/121
763	515 14	NO BROTHERS DEAD OUT	20 VAR20	60.000	col 31= 00
764	516 2	MOTHER DEAD MOTHER ALIVE	17 VAR17 16 VAR16	0. 2.0000	col 26= 99
845	531 2	RELATIONSHIP NOT FEMALE	2 VAR2	1.0000	col 1=1 (x)
850	532 4	LITERACY	37 VAR37	0.0000	col 61= 81
864	533 9	NO SISTERS DEAD OUT	22 VAR22	11.000	col 35= 01
897	537 8	FATHER DEAD	14 VAR14	0.	

APPENDIX 9

FIGURE 4

Households by village

VILLAGE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FREQUENCY	136	17	148	83	53	117	101	64	75	111	55	121	94	30	41	17[illegible]	255	119	[illegible]	2[illegible]
PERCENT	6.6	.8	7.1	4.0	2.6	5.7	4.9	3.1	3.6	5.4	2.7	5.8	4.5	1.4	2.0	[illegible]	12.3	5.7	3.0	1.[illegible]
CUM PERCENT	6.6	7.4	14.5	18.6	21.1	26.8	31.6	34.7	38.4	43.7	46.4	52.2	56.8	58.2	60.2	[illegible]	81.6	86.7	89.7	91.[illegible]



VILLAGE	21	22	TOTAL
FREQUENCY	138	48	2090
PERCENT	6.7	2.3	100.0
CUM PERCENT	97.7	100.0	100.0

1. Bela Mohmandan
2. Jogani
3. Sarkhana
4. Piari Payan
5. Piari Bala
6. Wazir Kali
7. Shahghali Bala
8. Shahghali Payan
9. Dang Lakhta
10. Nilavi
11. Sher Kali
12. Zormandi I
13. Garhi Sharif Khan
14. Gidar
15. Khwaji
16. Michni
17. Qila Shah Beg
18. Dheri Kali
19. Karyana
20. Zormandi 2
21. Bhattian
22. Ghari Hamza

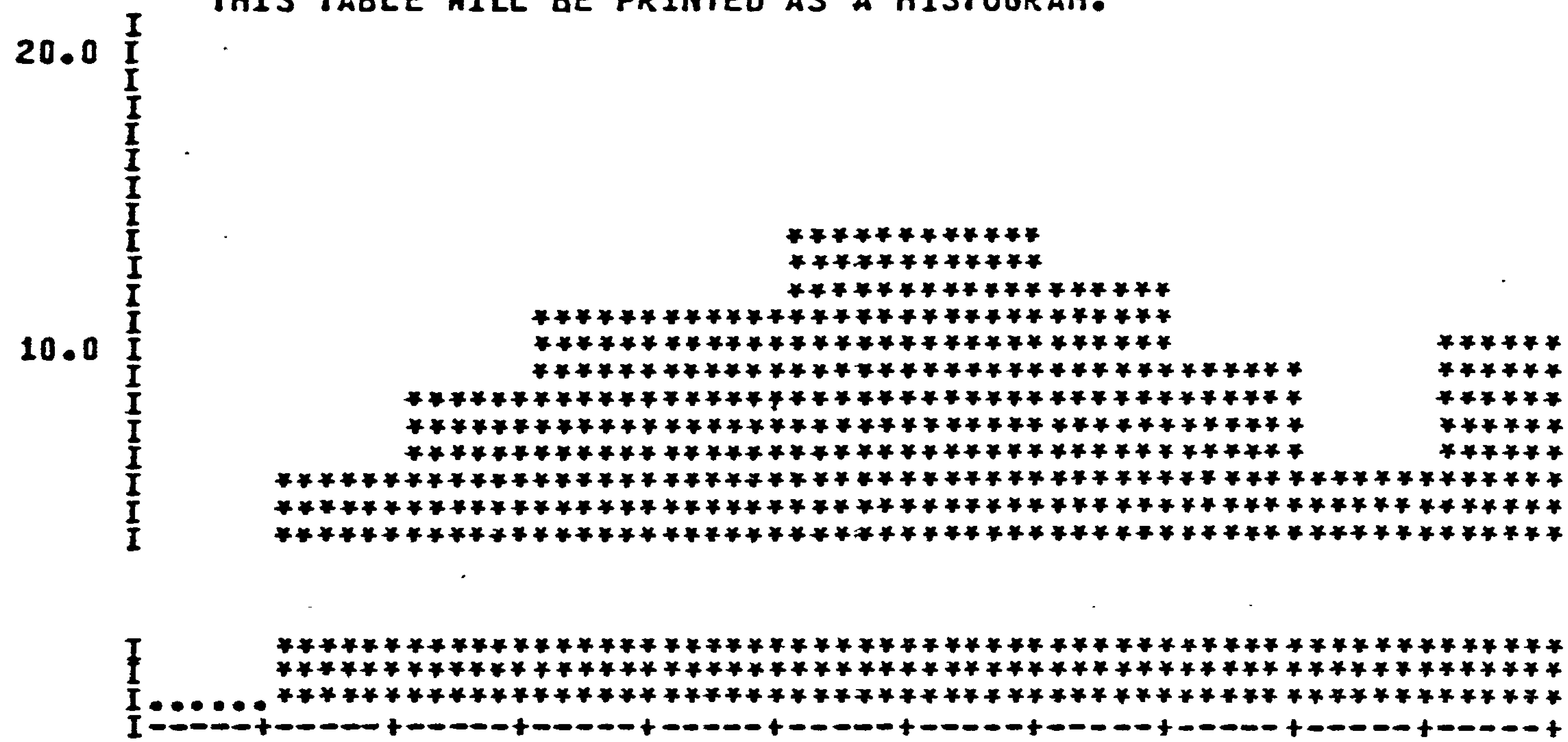
FIGURE 5

HOUSEHOLDS BY NUMBER OF PERSONS

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYPER	13 PER	11	1_10

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.



CLASS	1	2	3	4	5	6	7	8	9	10	11 ← No. OF PERSONS
FREQUENCY	9	111	164	226	235	288	280	239	184	119	215
PERCENT	.4	5.4	7.9	10.9	11.4	13.9	13.5	11.5	8.9	5.7	10.4
CUM PERCENT	.4	5.8	13.7	24.6	36.0	49.9	63.4	75.0	83.9	89.6	100.0

FIGURE 6

AGE PYRAMID FOR STUDY POPULATION

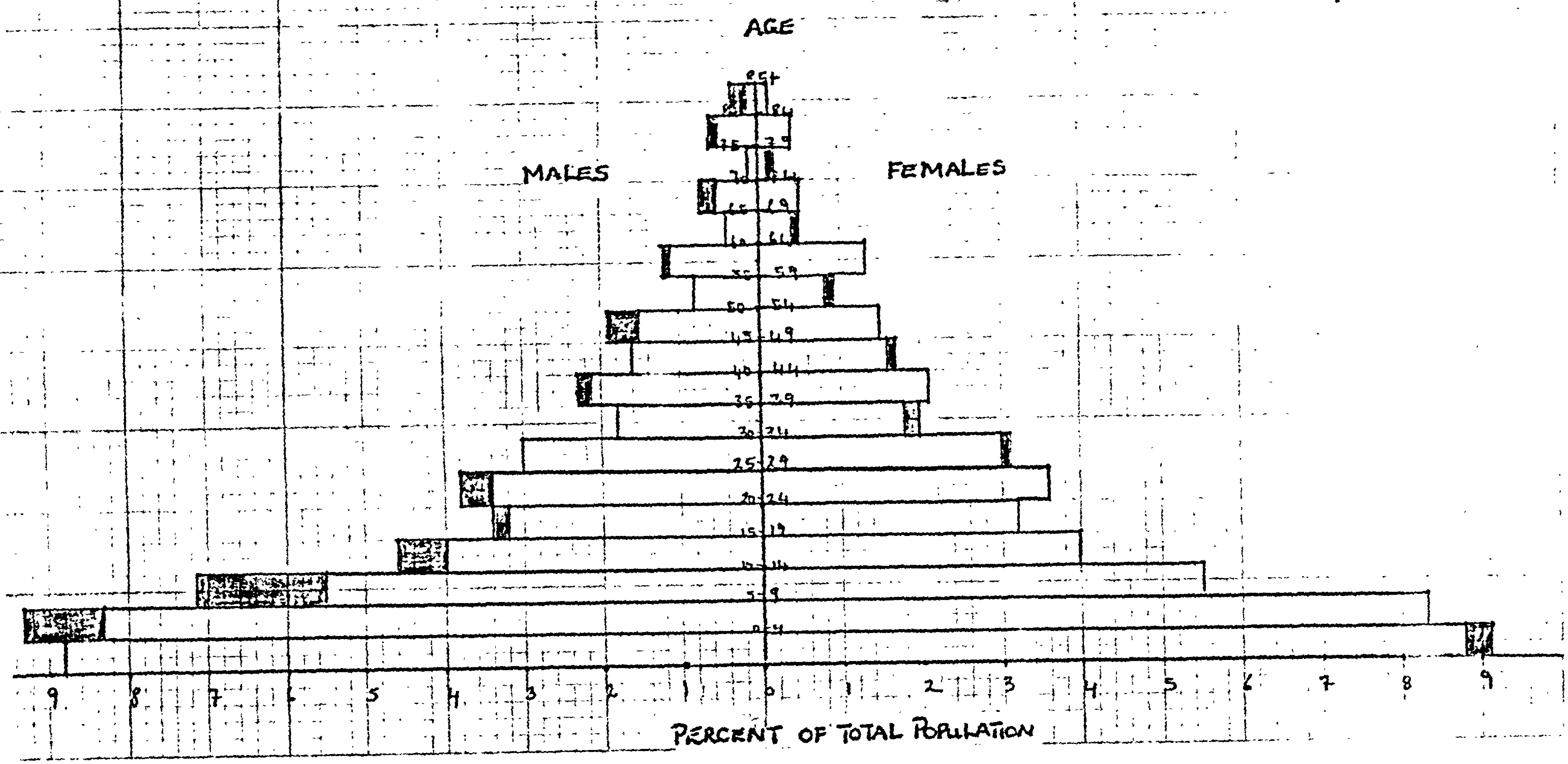


FIGURE 7

HOUSEHOLDS BY TRIBE

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYTRB	4 TRB	3	1,2

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.

```
      I
 80.0 I******
      I******
 70.0 I******
      I******
 60.0 I******
      I******
 50.0 I******
      I******
 40.0 I******
      I******
 30.0 I******
      I******
 20.0 I************
      I************
 10.0 I************
      I************
      I-----+-----+-----+

CLASS             1     2     3
FREQUENCY      1655   415     0
PERCENT        80.0  20.0   0.0
CUM PERCENT80.0 100.0 100.0
```

1 = MOHMAND

2 = DAUDZAI AND OTHER

FIGURE 8

Households By Type OF House

```
                                                    TABLE STRUCTURE
                                                    ===============

                                   FACTOR      VARIABLE     LEVELS     BOUNDARIES
                                   ------      --------     ------     ----------
                                   BYWLS       16  WLS           3     1,2
            THIS TABLE WILL BE PRINTED AS A HISTOGRAM.
        I
  100.0 I******
        I******
   90.0 I******
        I******
   80.0 I******
        I******
   70.0 I******
        I******
   60.0 I******
        I******
   50.0 I******
        I******
   40.0 I******
        I******
   30.0 I******
        I******
   20.0 I******
        I******
   10.0 I******
        I******......
        I-----+-----+-----+

CLASS             1      2      3
FREQUENCY      2065      5      0
PERCENT        99.8     .2    0.0
CUM PERCENT    99.8  100.0  100.0
```

1 = MUD
2 = CEMENT

FIGURE 9

HOUSEHOLDS BY NUMBER OF ROOMS

```
                                              TABLE STRUCTURE
                                              ===============

                                   FACTOR     VARIABLE    LEVELS     BOUNDARIES
                                   ------     --------    ------     ----------
                                   BYROM      14  ROM         11     1_10

       THIS TABLE WILL BE PRINTED AS A HISTOGRAM.
       I
  50.0 I
       I
       I******
       I******
  40.0 I******
       I******
       I******
       I************
  30.0 I************
       I************
       I************
       I************
  20.0 I************
       I************
       I******************
       I******************
  10.0 I******************
       I******************
       I************************
       I******************************....................................
       I-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+

CLASS          1     2     3     4     5     6     7     8     9    10    11
FREQUENCY    909   682   300   119    34    12     6     1     2     1     4
PERCENT     43.9  32.9  14.5   5.7   1.6    .6    .3    .0    .1    .0    .2
CUM PERCENT 43.9  76.9  91.4  97.1  98.7  99.3  99.6  99.7  99.8  99.8 100.0
```

No. OF ROOMS

FIGURE 10

HOUSEHOLDS BY OWNERSHIP OF MODERN OBJECTS

```
                                                TABLE STRUCTURE
                                                ===============

                              FACTOR      VARIABLE      LEVELS     BOUNDARIES
                              ------      --------      ------     ----------
                              BYMOBJ      19  MOBJ           3     1,2

         THIS TABLE WILL BE PRINTED AS A HISTOGRAM.
        I
  60.0  I
        I******
        I******
  50.0  I******
        I******
        I************
  40.0  I************
        I************
        I************
  30.0  I************
        I************
        I************
  20.0  I************
        I************
        I************
  10.0  I************
        I************
        I************
        I-----+-----+-----+

CLASS            1     2     3
FREQUENCY     1140   930     0
PERCENT       55.1  44.9   0.0
CUM PERCENT   55.1 100.0 100.0
```

1 = MODERN OBJECTS
2 = NO MODERN OBJECTS

FIGURE 11

HOUSEHOLDS BY OWNERSHIP STATUS

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYOST	18 OST	3	1,2

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.

```
        I
 90.0   I
        I******
 80.0   I******
        I******
 70.0   I******
        I******
 60.0   I******
        I******
 50.0   I******
        I******
 40.0   I******
        I******
 30.0   I******
        I******
 20.0   I******
        I************
 10.0   I************
        I************
        I-----+-----+-----+

CLASS            1      2      3
FREQUENCY     1714    356      0
PERCENT       82.8   17.2    0.0
CUM PERCENT82.8  100.0  100.0
```

1 = HOUSE OWNED

2 = HOUSE NOT OWNED

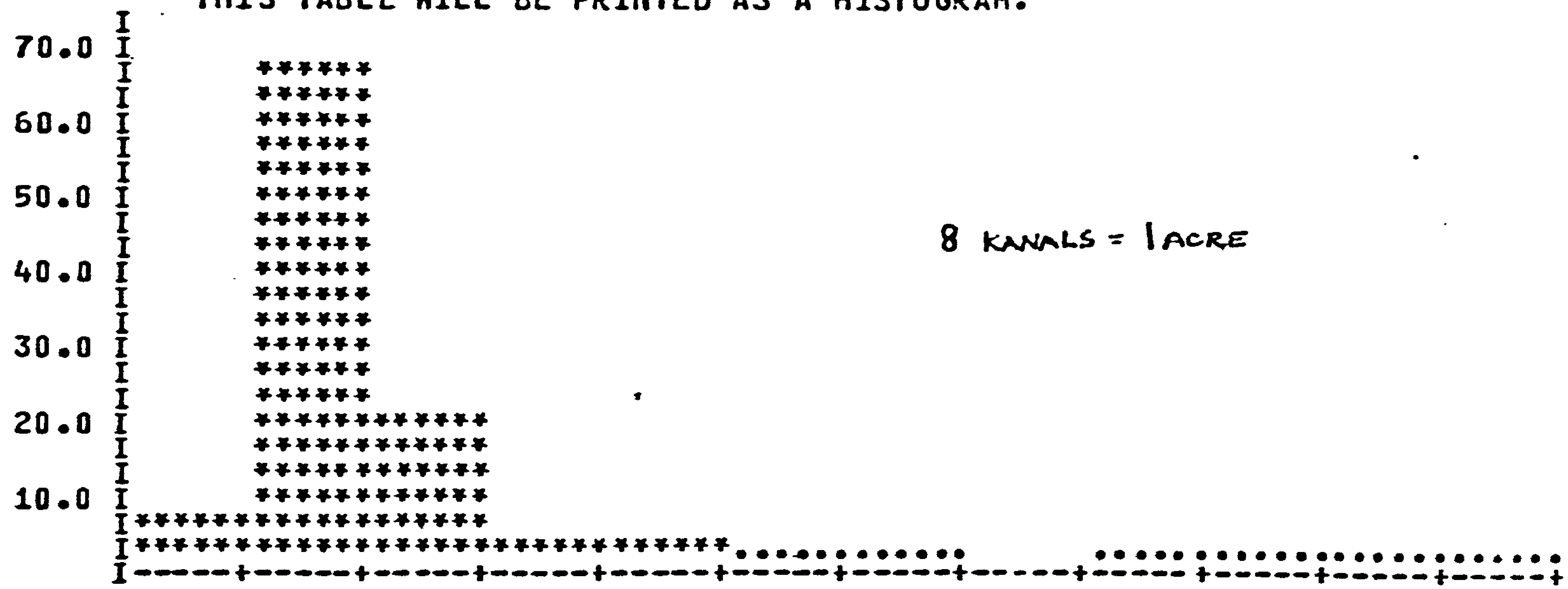
FIGURE 12

HOUSEHOLDS BY LAND AREA OF HOUSE

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYHOU	20 HOU	12	0_10

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.



CLASS	1	2	3	4	5	6	7	8	9	10	11	12 ← KANALS
FREQUENCY	167	1346	386	100	47	3	5	0	3	5	1	7
PERCENT	8.1	65.0	18.6	4.8	2.3	.1	.2	0.0	.1	.2	.0	.3
CUM PERCENT	8.1	73.1	91.7	96.6	98.8	99.0	99.2	99.2	99.4	99.6	99.7	100.0

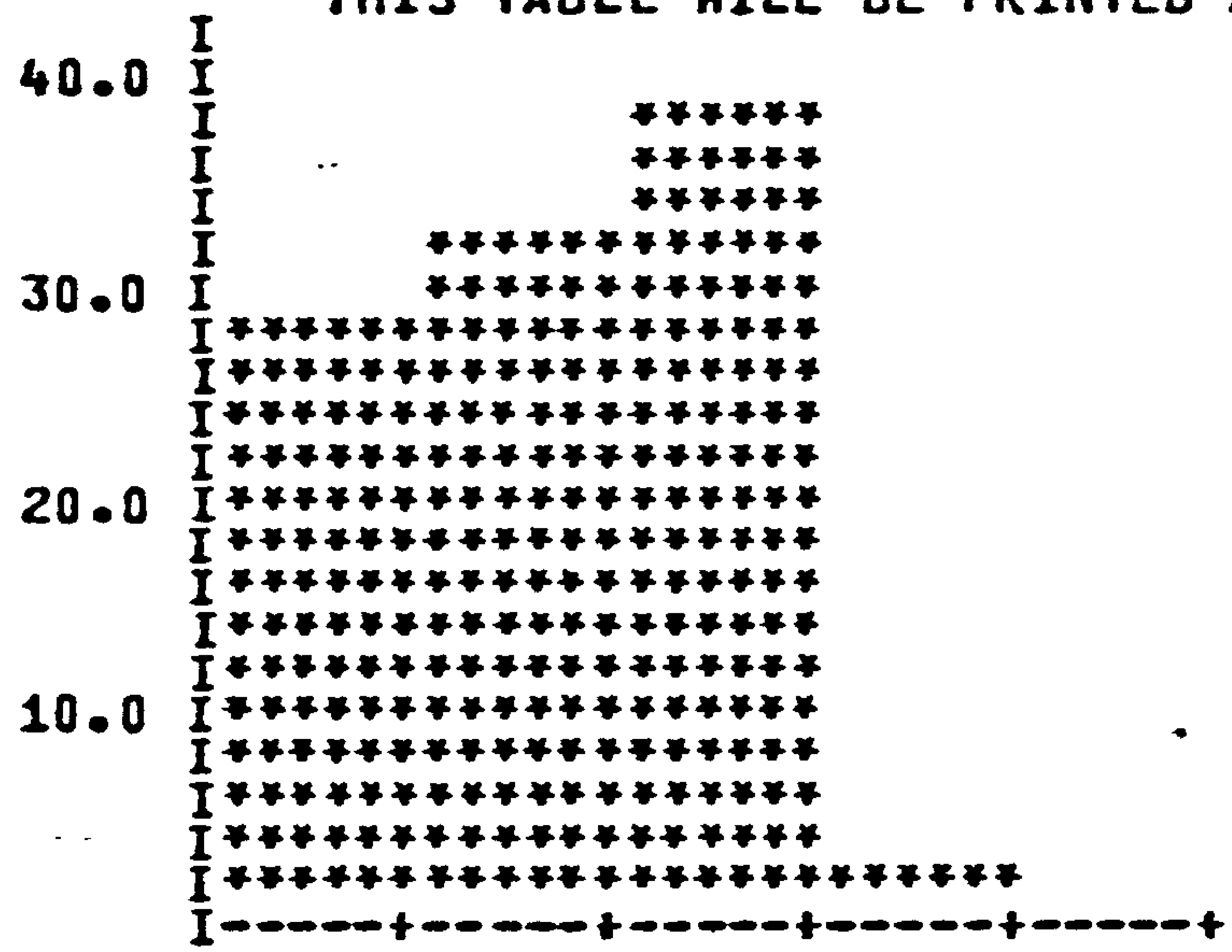
FIGURE 13

HOUSEHOLDS BY SOURCE OF DRINKING WATER

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYWAT	17 WAT	5	1_4

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.



1 = Own well
2 = Other well
3 = River/Stream + Other well
4 = Piped Water

CLASS	1	2	3	4	5
FREQUENCY	572	675	796	27	0
PERCENT	27.6	32.6	38.5	1.3	0.0
CUM PERCENT	27.6	60.2	98.7	100.0	100.0

FIGURE 14

HOUSEHOLDS BY FAMILY TYPE

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYFTY	37 FTY	4	1,3

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.

```
        I
  70.0  I
        I******
        I******
  60.0  I******
        I******
        I******
  50.0  I******
        I******
        I******
  40.0  I******
        I******
        I******
  30.0  I******
        I************
        I************
  20.0  I************
        I************
        I************
  10.0  I******************
        I******************
        I******************
        I-----+-----+-----+-----+
```

1= ELEMENTARY FAMILY
2= JOINT FAMILY
3= EXTENDED JOINT FAMILY

CLASS	1	2	3	4
FREQUENCY	1353	519	198	0
PERCENT	65.4	25.0	9.6	0.0
CUM PERCENT	65.4	90.4	100.0	100.0

FIGURE 15a

HOUSEHOLDS BY ECONOMIC CATEGORY

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYECAT	3 ECAT	4	1_3

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.

```
        I
  60.0  I
        I******
        I******
  50.0  I******
        I******
        I******
  40.0  I******
        I******
        I******
  30.0  I******
        I************
        I************
  20.0  I************
        I******************
        I******************
  10.0  I******************
        I******************
        I******************
        I-----+-----+-----+-----+

CLASS            1     2     3     4
FREQUENCY     1188   527   355     0
PERCENT       57.4  25.5  17.1   0.0
CUM PERCENT   57.4  82.9 100.0 100.0
```

1 = Owner-non-cultivator, owner cultivator, owner and tenant cultivator
2 = Tenant cultivator, wage labourer
3 = Other.

FIGURE 15b

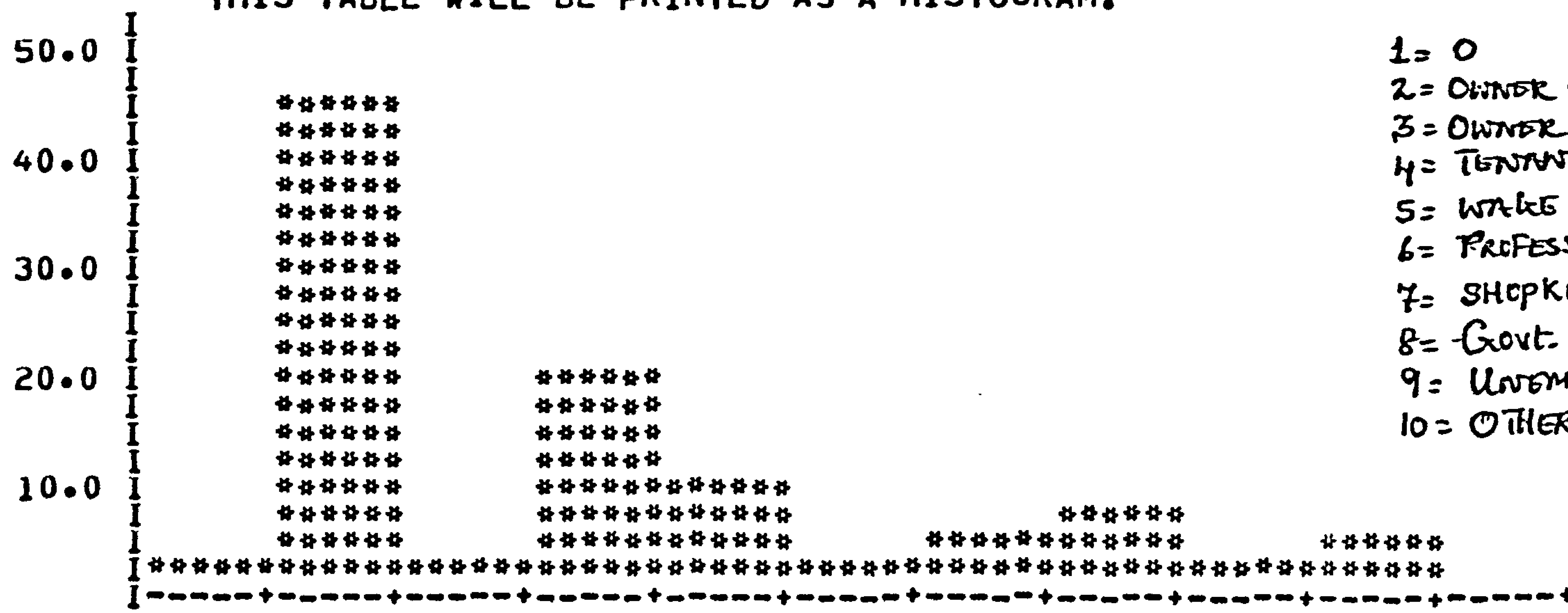
OCCUPATION OF HEAD OF HOUSEHOLD

2050 CASES WERE SELECTED FOR THIS TABLE.

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYOCCUP	76 OCCUP	11	0-9

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.



1= 0
2= OWNER CULTIVATOR
3= OWNER NON-CULTIVATOR
4= TENANT
5= WAGE LABOURER
6= PROFESSIONAL TRADE (CARPENTER, BARBER etc)
7= SHOPKEEPER
8= GOVT. SERVICE
9= UNEMPLOYED
10= OTHER

CLASS	1	2	3	4	5	6	7	8	9	10	11
FREQUENCY	31	920	53	409	218	52	91	164	30	82	0
PERCENT	1.5	44.9	2.6	20.0	10.6	2.5	4.4	8.0	1.5	4.0	0.0
CUM PERCENT	1.5	46.4	49.0	68.9	79.6	82.1	86.5	94.5	96.0	100.0	100.0

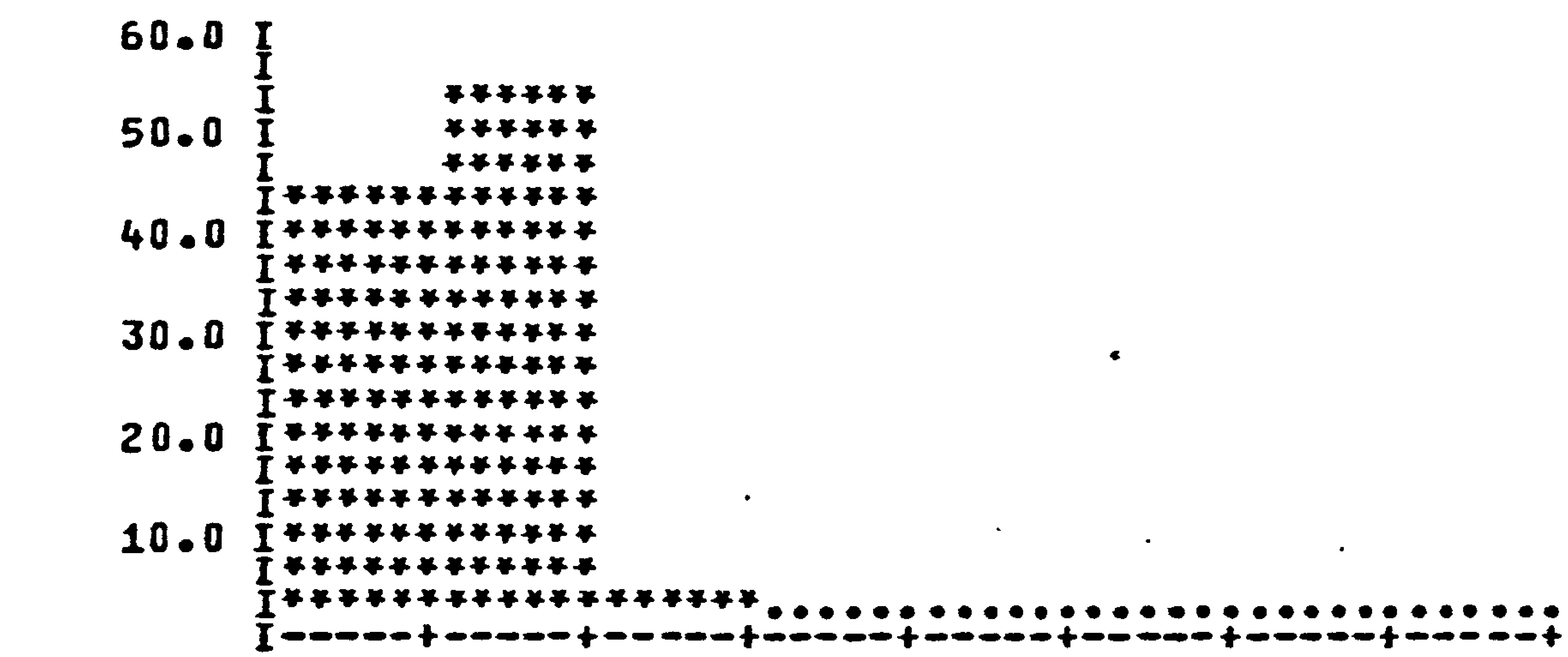
FIGURE 16a

HOUSEHOLDS BY LANDHOLDING

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYOIRRG	21 OIRRG	8	0,9[10]59

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.



CLASS	1	2	3	4	5	6	7	8
FREQUENCY	876	1087	82	14	4	1	1	5
PERCENT	42.3	52.5	4.0	.7	.2	.0	.0	.2
CUM PERCENT	42.3	94.8	98.8	99.5	99.7	99.7	99.8	100.0

← acres

Acres

0
1–9
10–19
20–29
30–39
40–49
50–59
60+

FIGURE 16b

HOUSEHOLDS BY RENTED LAND

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYRIRRG	22 RIRRG	8	0,9[10]59

Acres
0
1-9
10-19
20-29
30-39
40-49
50-59
60+

```
         THIS TABLE WILL BE PRINTED AS A HISTOGRAM.
      I
 70.0 I
      I******
      I******
 60.0 I******
      I******
      I******
 50.0 I******
      I******
      I******
 40.0 I******
      I******
      I******
 30.0 I************
      I************
      I************
 20.0 I************
      I************
      I************
 10.0 I************
      I************
      I************............      ......
      I-----+-----+-----+-----+-----+-----+-----+-----+

CLASS             1     2     3     4     5     6     7     8 <-- acres
FREQUENCY      1394   649    23     3     0     1     0     0
PERCENT        67.3  31.4   1.1    .1   0.0    .0   0.0   0.0
CUM PERCENT    67.3  98.7  99.8 100.0 100.0 100.0 100.0 100.0
```

FIGURE 16c

Households By Unirrigated Land

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYUNIRRG	23 UNIRRG	8	0,9[10]59

```
                THIS TABLE WILL BE PRINTED AS A HISTOGRAM.
         I
   90.0  I
         I******
   80.0  I******
         I******
   70.0  I******
         I******
   60.0  I******
         I******
   50.0  I******
         I******
   40.0  I******
         I******
   30.0  I******
         I******
   20.0  I******
         I******
   10.0  I************
         I************..............................
         I-----+-----+-----+-----+-----+-----+-----+-----+

CLASS            1     2     3     4     5     6     7     8
FREQUENCY     1794   211    33    11     4     4     6     7
PERCENT       86.7  10.2   1.6    .5    .2    .2    .3    .3
CUM PERCENT86.7  96.9  98.5  99.0  99.2  99.4  99.7 100.0
```

Acres
0
1-9
10-19
20-29
30-39
40-49
50-59
60+

FIGURE 17a

HOUSEHOLDS BY OWNERSHIP OF LIVESTOCK: COWS

```
                                        TABLE STRUCTURE
                                        ===============
                        FACTOR      VARIABLE     LEVELS     BOUNDARIES
                        ------      --------     ------     ----------
                        BYCWS       29  CWS           2     0

            THIS TABLE WILL BE PRINTED AS A HISTOGRAM.
           I
    60.0   I       ******
           I       ******
           I       ******
    50.0   I       ******
           I       ******
           I       ******
    40.0   I************
           I************
           I************
    30.0   I************
           I************
           I************
    20.0   I************
           I************
           I************
    10.0   I************
           I************
           I************
           I-----+------+

CLASS          1     2
FREQUENCY    842  1228
PERCENT     40.7  59.3
CUM PERCENT 40.7 100.0
```

1 = 0
2 = 1 and more

FIGURE 17b

HOUSEHOLDS BY OWNERSHIP OF LIVESTOCK : OXEN

```
                                        TABLE STRUCTURE
                                        ===============
                              FACTOR      VARIABLE     LEVELS     BOUNDARIES
                              ------      --------     ------     ----------
                              BYOX        31   OX           2     0

          THIS TABLE WILL BE PRINTED AS A HISTOGRAM.
          I
   70.0   I
          I
          I
   60.0   I******
          I******
          I******
   50.0   I******
          I******
          I******
   40.0   I************
          I************
          I************
   30.0   I************
          I************
          I************
   20.0   I************
          I************
          I************
   10.0   I************
          I************
          I************
          I-----+-----+

CLASS          1     2
FREQUENCY   1262   808
PERCENT     61.0  39.0
CUM PERCENT61.0 100.0
```

1 = 0
2 = 1 AND MORE

FIGURE 17c

HOUSEHOLDS BY OWNERSHIP OF LIVESTOCK: BUFFALOES

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYBUF	28 BUF	2	0

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.

```
        I
  80.0  I
        I
  70.0  I******
        I******
  60.0  I******
        I******
  50.0  I******
        I******
  40.0  I******
        I******
  30.0  I************
        I************
  20.0  I************
        I************
  10.0  I************
        I************
        I-----+-----+

CLASS           1     2
FREQUENCY    1456   614

PERCENT      70.3  29.7
CUM PERCENT  70.3 100.0
```

1 = 0
2 = 1 AND MORE

FIGURE 17d

HOUSEHOLDS BY OWNERSHIP OF LIVESTOCK : GOATS

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYGTS	30 GTS	2	0

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.

1 = 0
2 = 1 AND MORE

```
        I
   70.0 I
        I
        I******
   60.0 I******
        I******
        I******
   50.0 I******
        I******
        I******

   40.0 I******
        I************
        I************
   30.0 I************
        I************
        I************
   20.0 I************
        I************
        I************
   10.0 I************
        I************
        I************
        I-----+-----+
CLASS          1     2
FREQUENCY   1285   785
PERCENT     62.1  37.9
CUM PERCENT62.1 100.0
```

FIGURE 18a

HOUSEHOLDS BY BUDGET

TABLF STRUCTURE

FACTOR	VARIABLF	LEVELS	BOUNDARIES
BYIDIFF	89 IDIFF	4	1→3

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.

```
       I
 60.0  I
       I      ******
       I      ******
 50.0  I      ******
       I      ******
       I      ******
 40.0  I      ******
       I      ******
       I      ************
 30.0  I      ************
       I      ************
       I      ************
 20.0  I      ************
       I      ************
       I******************
 10.0  I******************
       I******************
       I******************
       I-----+-----+-----+-----+

CLASS            1     2     3     4
FREQUENCY      257  1150   663     0
PERCENT       12.4  55.6  32.0   0.0
CUM PERCENT   12.4  68.0 100.0 100.0
```

1 = EXPENDITURE LESS THAN INCOME (<)
2 = EXPENDITURE EQUAL TO INCOME (=)
3 = EXPENDITURE MORE THAN INCOME (>)

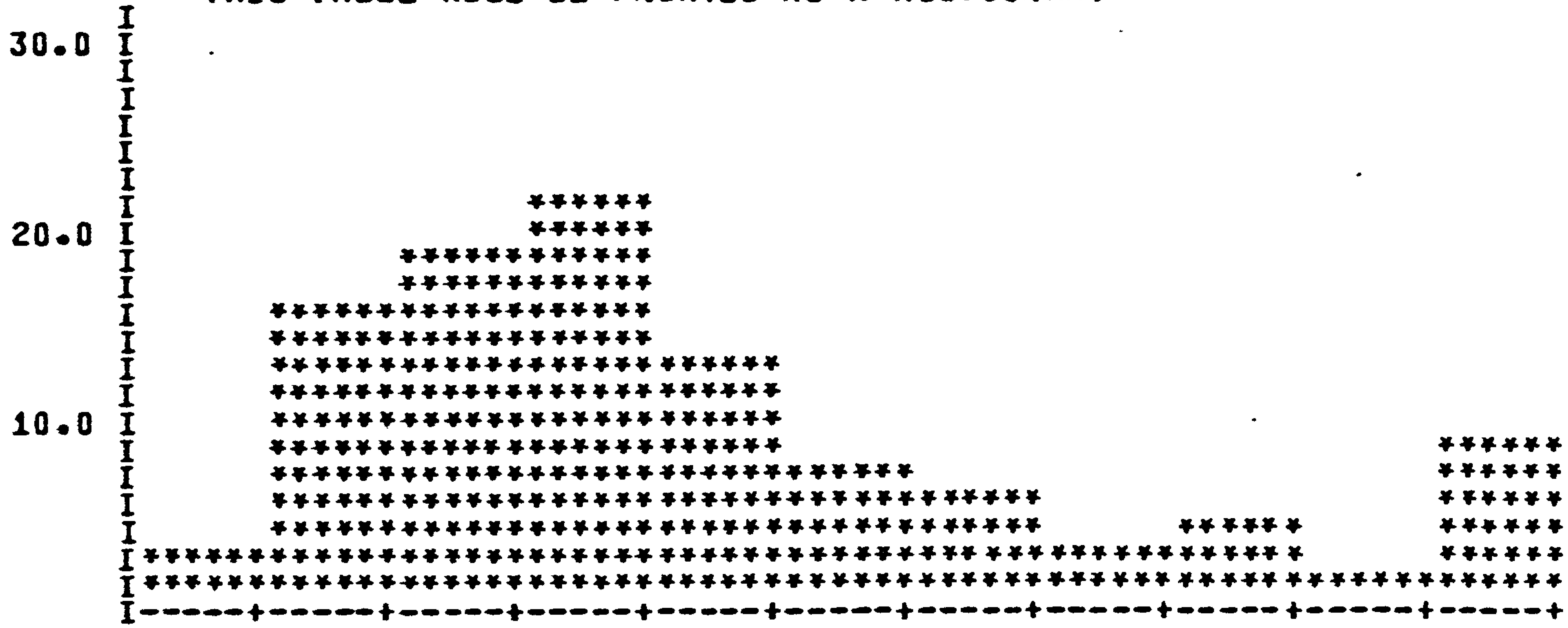
FIGURE 18 b

HOUSEHOLDS BY INCOME

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYIN	32 IN	11	9[10]99

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.



CLASS	1	2	3	4	5	6	7	8	9	10	11 — INCOME
FREQUENCY	51	325	397	430	254	152	131	55	76	36	163
PERCENT	2.5	15.7	19.2	20.8	12.3	7.3	6.3	2.7	3.7	1.7	7.9
CUM PERCENT	2.5	18.2	37.3	58.1	70.4	77.7	84.1	86.7	90.4	92.1	100.0

INCOME (RUPEES)

1 = 0 – 900
2 = 1000 – 1900
3 = 2000 – 2900
4 = 3000 – 3900
5 = 4000 – 4900
6 = 5000 – 5900
7 = 6000 – 6900
8 = 7000 – 7900
9 = 8000 – 8900
10 = 9000 – 9900
11 = 10 000+

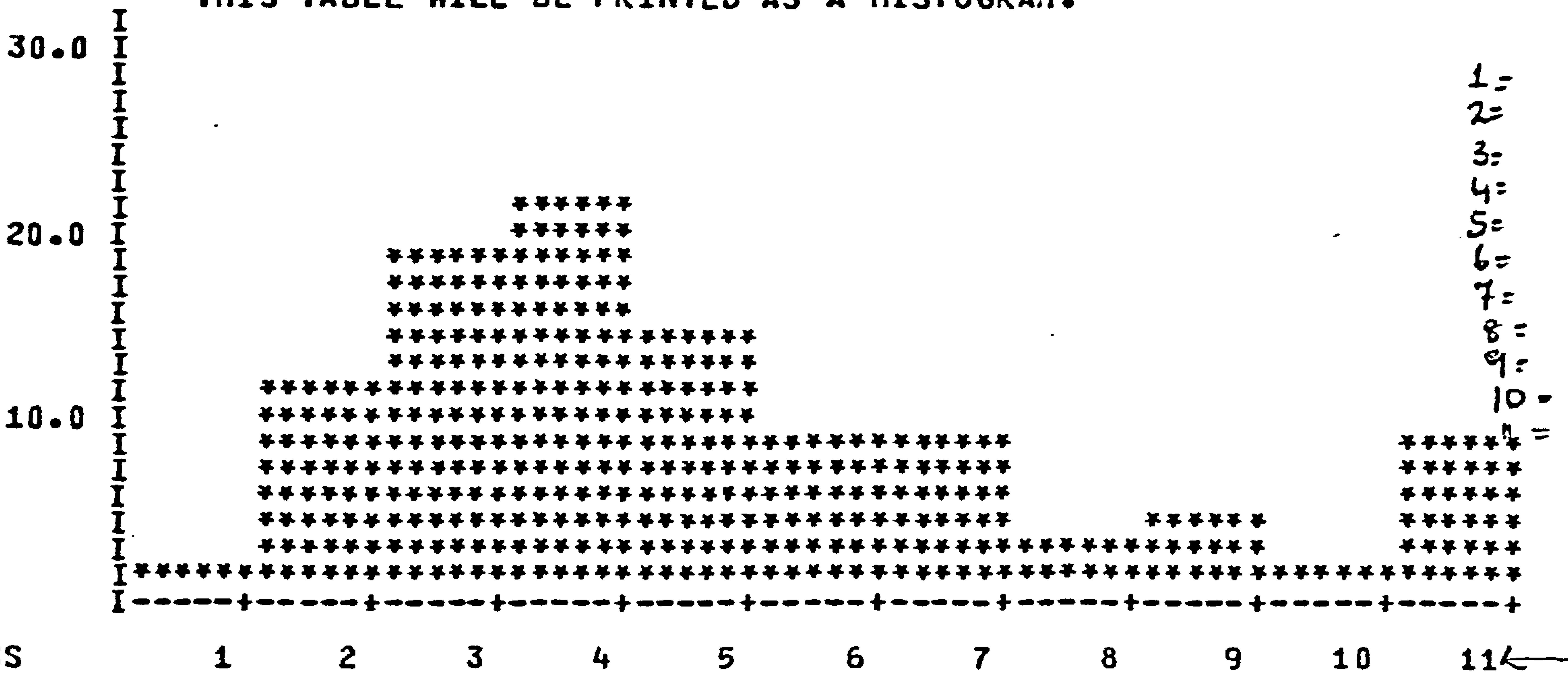
FIGURE 19C

HOUSEHOLDS BY EXPENDITURE

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYEXPDT	33 EXPDT	11	9[10]99

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.



EXPENDITURE (RUPEES)

1 = 0 — 900
2 = 1000 — 1900
3 = 2000 — 2900
4 = 3000 — 3900
5 = 4000 — 4900
6 = 5000 — 5900
7 = 6000 — 6900
8 = 7000 — 7900
9 = 8000 — 8900
10 = 9000 — 9900
11 = 10000+

CLASS	1	2	3	4	5	6	7	8	9	10	11
FREQUENCY	24	233	389	443	285	173	179	68	81	31	164
PERCENT	1.2	11.3	18.8	21.4	13.8	8.4	8.6	3.3	3.9	1.5	7.9
CUM PERCENT	1.2	12.4	31.2	52.6	66.4	74.7	83.4	86.7	90.6	92.1	100.0

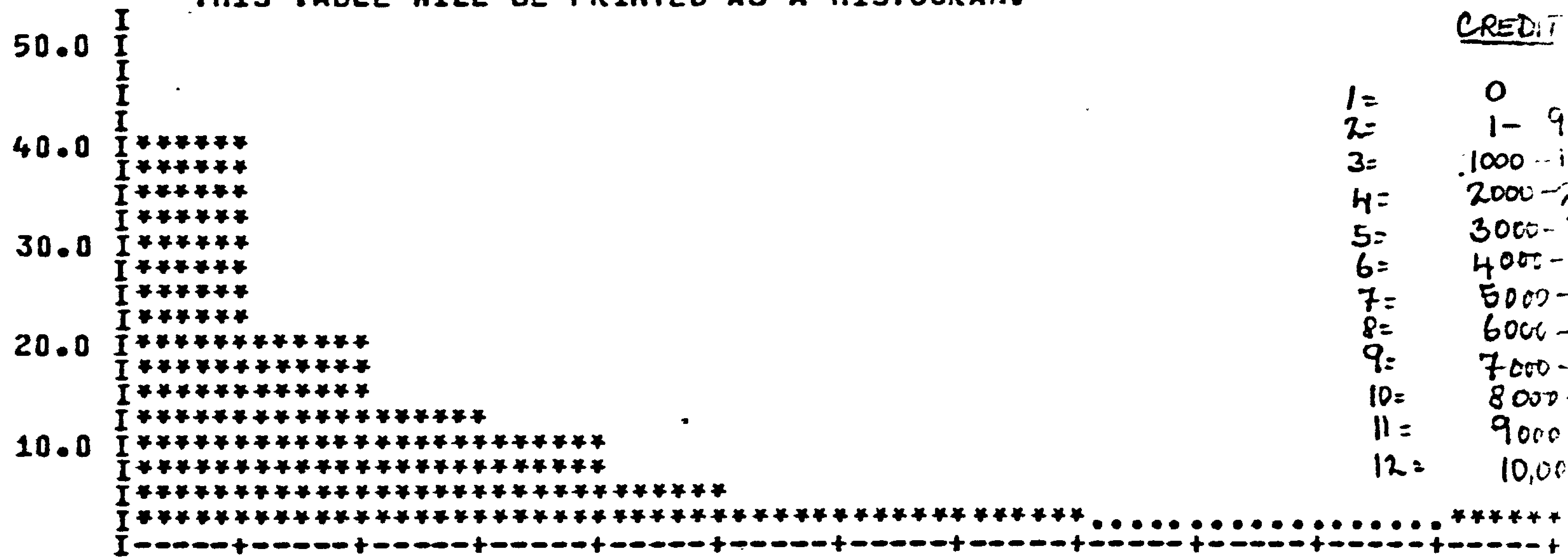
Figure 19a

Households By Credit

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYCRDT	34 CRDT	12	0,9(10199

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.



CREDIT (Rupees)

1=	0
2=	1- 900
3=	1000-1900
4=	2000-2900
5=	3000-3900
6=	4000-4900
7=	5000-5900
8=	6000-6900
9=	7000-7900
10=	8000-8900
11=	9000-9900
12=	10,000+

CLASS	1	2	3	4	5	6	7	8	9	10	11	12 ← CREDIT
FREQUENCY	850	395	247	201	126	77	39	36	14	18	4	63
PERCENT	41.1	19.1	11.9	9.7	6.1	3.7	1.9	1.7	.7	.9	.2	3.0
CUM PERCENT	41.1	60.1	72.1	81.8	87.9	91.6	93.5	95.2	95.9	96.8	97.0	100.0

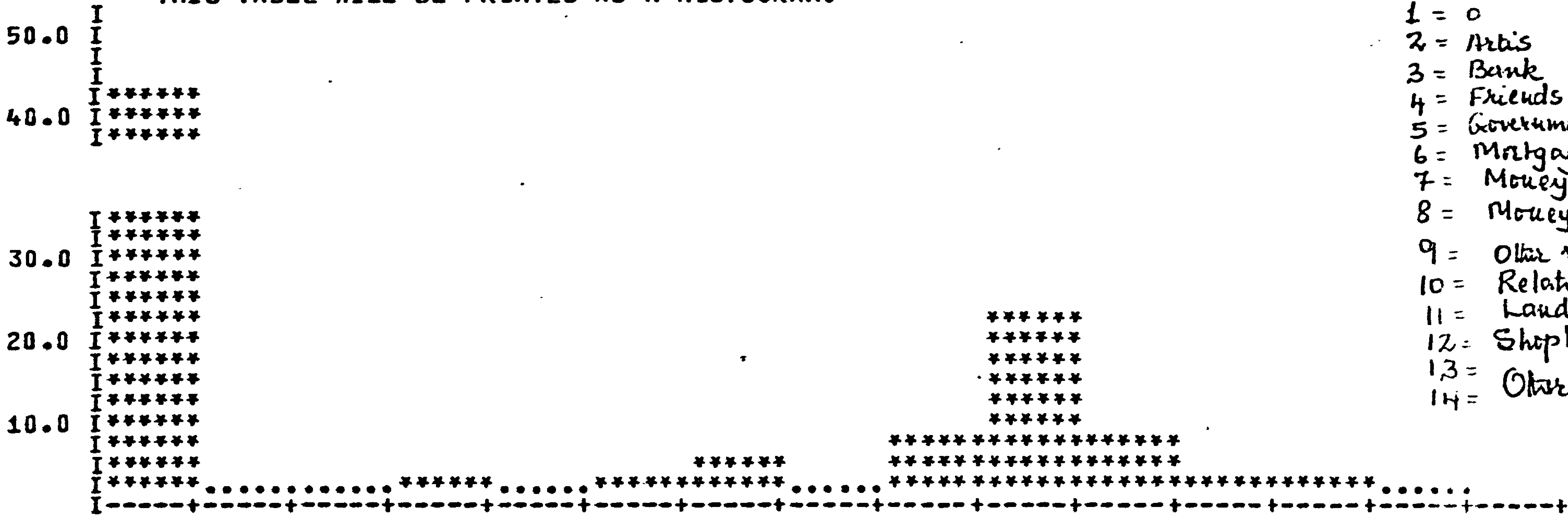
FIGURE 19b

HOUSEHOLDS BY SOURCE OF CREDIT

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYSOU	35 SOU	15	0_13

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.



CLASS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
FREQUENCY	879	18	14	69	17	62	124	5	135	472	167	58	40	10	0
PERCENT	42.5	.9	.7	3.3	.8	3.0	6.0	.2	6.5	22.8	8.1	2.8	1.9	.5	0.0
CUM PERCENT	42.5	43.3	44.0	47.3	48.2	51.2	57.1	57.4	63.9	86.7	94.8	97.6	99.5	100.0	100.0

1 = 0
2 = Artis
3 = Bank
4 = Friends
5 = Government
6 = Mortgage of land
7 = Moneylender
8 = Moneylender + Friends
9 = Other villagers
10 = Relatives
11 = Landlord
12 = Shopkeeper
13 =
14 = Other

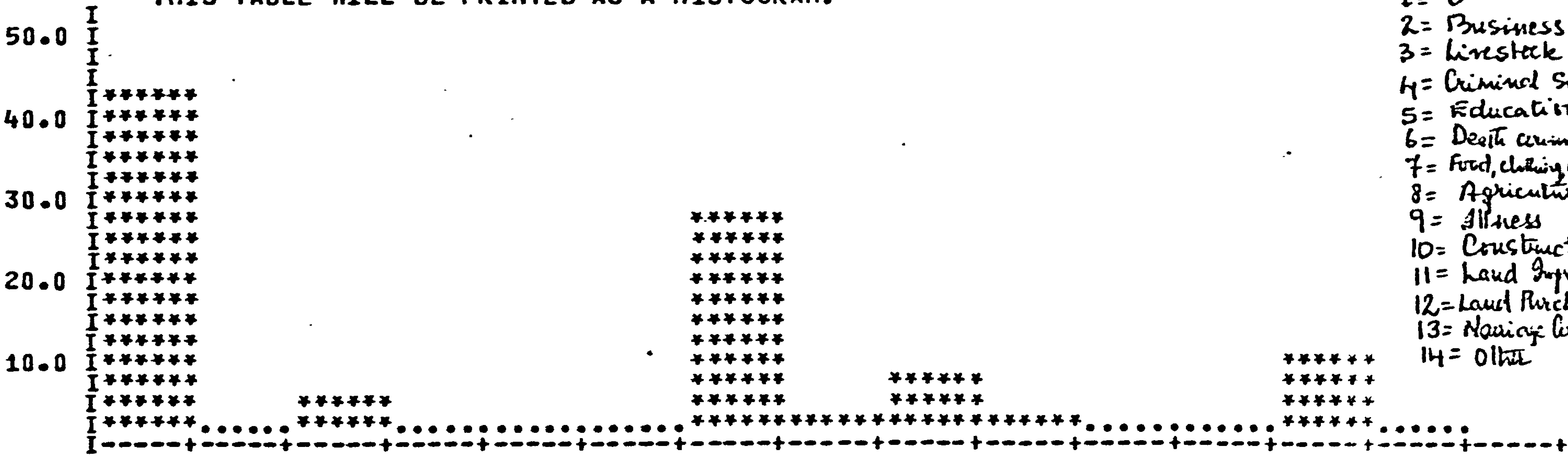
FIGURE 19C

HOUSEHOLDS BY PURPOSE OF CREDIT

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYPUR	36 PUR	15	0_13

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.



1= 0
2= Business
3= Livestock
4= Criminal Suit
5= Education
6= Death ceremonial
7= Food, clothing, medicine
8= Agriculture
9= Illness
10= Construction
11= Land Improvement
12= Land Purchase
13= Marriage Ceremonial
14= Other

CLASS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
FREQUENCY	879	21	93	16	3	20	567	45	144	27	16	24	191	24	0
PERCENT	42.5	1.0	4.5	.8	.1	1.0	27.4	2.2	7.0	1.3	.8	1.2	9.2	1.2	0.0
CUM PERCENT	42.5	43.5	48.0	48.7	48.9	49.9	77.2	79.4	86.4	87.7	88.5	89.6	98.8	100.0	100.0

FIGURE 20a

PLACE OF BIRTH OF LAST CHILD

TABLE CONTENT

CASES ARE SELECTED FOR INCLUSION ONLY IF THEY SATISFY ALL OF THE FOLLOWING 2 CONDITIONS.

NAME	VARIABLE	VALID VALUES OR RANGES
SELW	42 SEX	2
SELM	45 MST	1

2968 CASES WERE SELECTED FOR THIS TABLE.

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYPCB	85 PCB	6	0,4

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.

```
        I
  90.0  I
        I          ******
  80.0  I          ******
        I          ******
  70.0  I          ******
        I          ******
  60.0  I          ******
        I          ******
  50.0  I          ******
        I          ******
  40.0  I          ******
        I          ******
  30.0  I          ******
        I          ******
  20.0  I          ******
        I          ******
  10.0  I************
        I************..................
        I-----+-----+-----+-----+-----+-----+

CLASS            1     2     3     4     5     6
FREQUENCY      348  2585    28     5     2     0
PERCENT       11.7  87.1    .9    .2    .1   0.0
CUM PERCENT   11.7  98.8  99.8  99.9 100.0 100.0
```

1 = 0

2 = HOME

3 = HOSPITAL

4 = } OTHER
5 = }

FIGURE 20b

ATTENDANT AT LAST BIRTH

TABLE CONTENT

CASES ARE SELECTED FOR INCLUSION ONLY IF THEY SATISFY ALL OF THE FOLLOWING ; CONDITIONS.

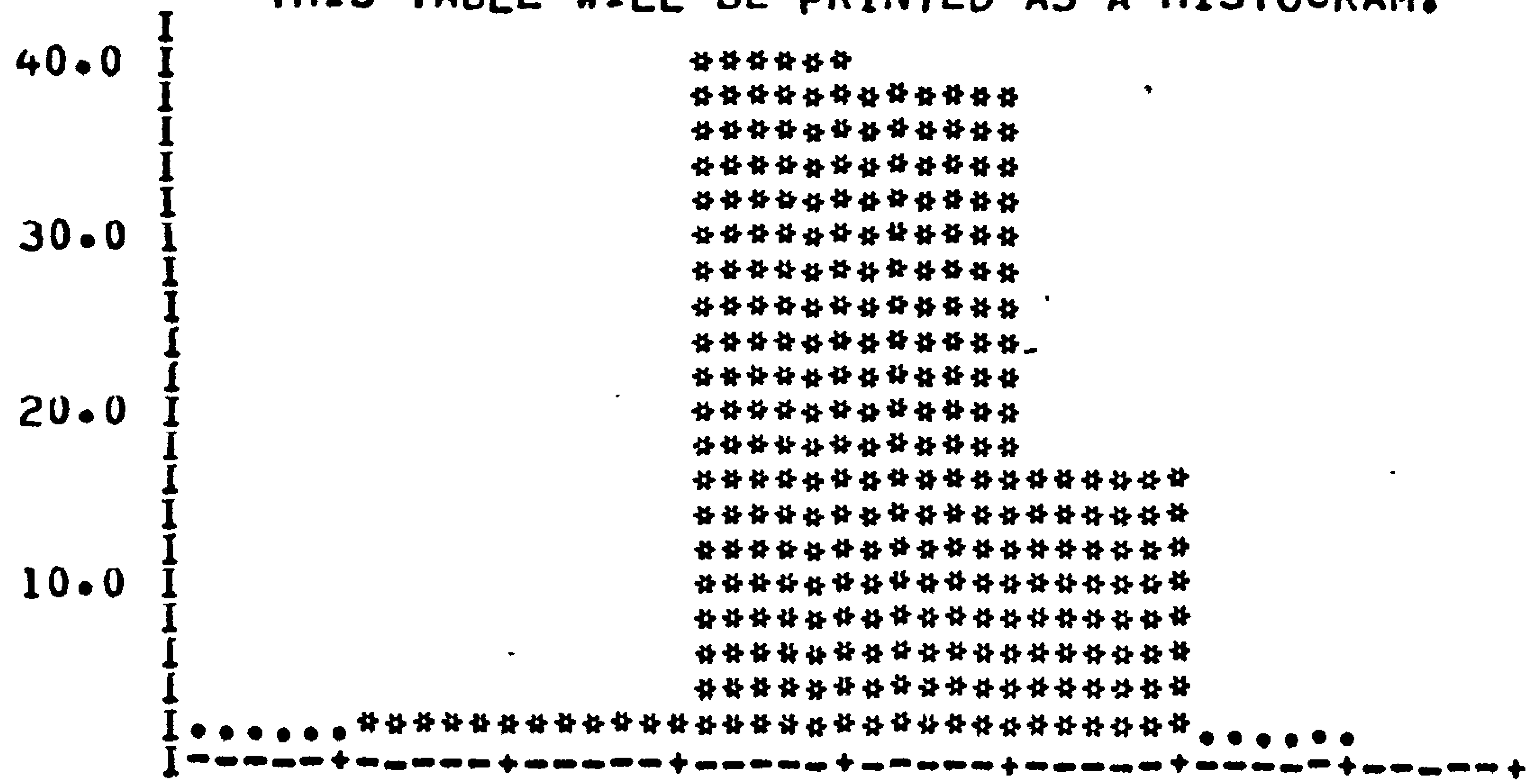
NAME	VARIABLE	VALID VALUES OR RANGES
SELW	42 SEX	2
SELM	45 MST	1
SELHHO	85 PCB	1, 2, 3, 4

2620 CASES WERE SELECTED FOR THIS TABLE.

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYATTD	86 ATTD	8	0,6

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.



CLASS	1	2	3	4	5	6	7	8
FREQUENCY	6	43	64	1042	1017	436	12	0
PERCENT	.2	1.6	2.4	39.8	38.8	16.6	.5	0.0
CUM PERCENT	.2	1.9	4.3	44.1	82.9	99.5	100.0	100.0

1 = 0
2 = DOCTOR
3 = TRAINED MIDWIFE
4 = DAI OR LOCAL MIDWIFE
5 = RELATIVE OR OTHER WOMAN
6 = OTHER
7 = SELF

FIGURE 21a

MARRIED MEN BY PLACE OF BIRTH

```
                                                            TABLE CONTENT
                                                            =============
       CASES ARE SELECTED FOR INCLUSION ONLY IF THEY SATISFY ALL OF THE FOLLOWING 2 CONDITIONS.
                              NAME         VARIABLE        VALID VALUES OR RANGES
                              -----        --------        ----------------------
                              SELW         42  SEX         2
                              SELM         45  MST         1
       2968 CASES WERE SELECTED FOR THIS TABLE.
                                                           TABLE STRUCTURE
                                                           ===============
                                FACTOR        VARIABLE     LEVELS      BOUNDARIES
                                ------        --------     ------      ----------
                                BYPB          44  PB            3      1,2
       THIS TABLE WILL BE PRINTED AS A HISTOGRAM.
        I
  70.0  I
        I
        I******
  60.0  I******
        I******
        I******
  50.0  I******
        I******
        I******
  40.0  I******
        I************
        I************
  30.0  I************
        I************
        I************
  20.0  I************
        I************
        I************
  10.0  I************
        I************
        I************
        I-----+-----+-----+

CLASS           1      2      3
FREQUENCY    1928   1040      0
PERCENT      65.0   35.0    0.0
CUM PERCENT65.0 100.0 100.0
```

1 = THIS VILLAGE

2 = OTHER VILLAGE

FIGURE 21b

MARRIED WOMEN BY PLACE OF BIRTH

TABLE CONTENT
=============

CASES ARE SELECTED FOR INCLUSION ONLY IF THEY SATISFY ALL OF THE FOLLOWING 2 CONDITIONS.

NAME	VARIABLE	VALID VALUES OR RANGES
SELME	42 SEX	1
SELM	45 MST	1

2593 CASES WERE SELECTED FOR THIS TABLE.

TABLE STRUCTURE
===============

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYPB	44 PB	3	1,2

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.

```
      I
90.0  I
      I******
80.0  I******
      I******
70.0  I******
      I******
60.0  I******
      I******
50.0  I******
      I******
40.0  I******
      I******
30.0  I******
      I******
20.0  I******
      I************
10.0  I************
      I************
      I-----+-----+-----+

CLASS             1      2      3
FREQUENCY      2249    344      0
PERCENT        86.7   13.3    0.0
CUM PERCENT    86.7  100.0  100.0
```

1 = THIS VILLAGE
2 = OTHER VILLAGE

FIGURE 22

HOUSEHOLDS BY NUMBER OF WIVES

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYWIFN	41 WIFN	6	0,4

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.

```
        I
  90.0  I      ******
        I      ******
  80.0  I      ******
        I      ******
  70.0  I      ******
        I      ******
  60.0  I      ******
        I      ******
  50.0  I      ******
        I      ******
  40.0  I      ******
        I      ******
  30.0  I      ******
        I      ******
  20.0  I      ******
        I      ******
  10.0  I      ******
        I******************......
        I-----+-----+-----+-----+-----+-----+
```

CLASS	1	2	3	4	5	6
FREQUENCY	127	1860	79	4	0	0
PERCENT	6.1	89.9	3.8	.2	0.0	0.0
CUM PERCENT	6.1	96.0	99.8	100.0	100.0	100.0

1 = 0
2 = 1 wife
3 = 2 wives
4 = 3 wives

FIGURE 23a

MALES BY LITERACY STATUS

TABLE CONTENT
=============

CASES ARE SELECTED FOR INCLUSION ONLY IF THEY SATISFY THE FOLLOWING CONDITION.

NAME	VARIABLE	VALID VALUES OR RANGES
SELME	42 SEX	1

7314 CASES WERE SELECTED FOR THIS TABLE.

TABLE STRUCTURE
===============

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYRW	75 RW	4	0,2

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.

```
        I
  90.0  I
        I
  80.0  I              ******
        I              ******
  70.0  I              ******
        I              ******
  60.0  I              ******
        I              ******
  50.0  I              ******
        I              ******
  40.0  I              ******
        I              ******
  30.0  I              ******
        I              ******
  20.0  I        ************
        I        ************
  10.0  I        ************
        I        ************
        I-----+-----+-----+-----+

CLASS          1     2     3     4
FREQUENCY      0  1332  5982     0
PERCENT      0.0  18.2  81.8   0.0
CUM PERCENT  0.0  18.2 100.0 100.0
```

1 = 0
2 = READ AND WRITE
3 = NOT READ AND WRITE

FIGURE 23b

FEMALES BY LITERACY STATUS

TABLE CONTENT

CASES ARE SELECTED FOR INCLUSION ONLY IF THEY SATISFY THE FOLLOWING CONDITION.

NAME	VARIABLE	VALID VALUES OR RANGES
SELW	42 SEX	2

6748 CASES WERE SELECTED FOR THIS TABLE.

TABLE STRUCTURE

FACTOR	VARIABLE	LEVELS	BOUNDARIES
BYRW	75 RW	4	0,2

THIS TABLE WILL BE PRINTED AS A HISTOGRAM.

```
      I
100.0 I           ******
      I           ******
 90.0 I           ******
      I           ******
 80.0 I           ******
      I           ******
 70.0 I           ******
      I           ******
 60.0 I           ******
      I           ******
 50.0 I           ******
      I           ******
 40.0 I           ******
      I           ******
 30.0 I           ******
      I           ******
 20.0 I           ******
      I           ******
 10.0 I           ******
      I     ......******
      I-----+-----+-----+-----+
CLASS          1     2     3     4
FREQUENCY      0    23  6725     0
PERCENT      0.0    .3  99.7   0.0
CUM PERCENT  0.0    .3 100.0 100.0
```

1 = 0
2 = READ AND WRITE
3 = NOT READ AND WRITE

APPENDIX 9: BUDGET

TOTAL BUDGET

		Rupees
1.	Pay of Consultant	30,000.00
2.	Pay of Male Interviewer	4,400.00
3.	Pay of Contactman	2,400.00
4.	Pay of Female Assistant	2,800.00
5.	Pay of Cleaner	2,750.00
6.	Pay of Chaukidar	4,550.00
7.	Pay of Driver	3,600.00
8.	Petrol, oil and maintenance	7,566.55
9.	Printing of Questionnaires - Pilot Study	320.00
10.	Cyclostyling of Questionnaires	3,000.00
10b.	Stationery, tabulation sheets	476.60
11.	Hiring of Transport while not having arrangements	3,900.00
12.	Rent of Office cum residential accommodation	28,500.00
13.	Postage, telegrams, stamps etc.	364.70
14.	Telephone charges	1,500.00
15.	Train ticket Karachi-Peshawar	391.00
	TOTAL	96,518.85
	+ Typewriter - £40	

EXPENDITURE FOR THE MONTHS OF JANUARY, FEBRUARY AND MARCH 1976

	Description	Rupees
1.	Pay of Consultant	6,000.00
2.	Pay of Male Interviewer	800.00
3.	Pay of Contactman	600.00
4.	Pay of Female Assistant	400.00
5.	Pay of Cleaner	450.00
6.	Pay of Chaukidar	1,050.00
7.	Pay of Driver	600.00
8.	Petrol, oil and maintenance cost	
	February	408.00
	March	755.50
9.	Printing of questionnaires for pilot study	320.00
10.	Cyclostyling of questionnaires for fieldwork	3,000.00
11.	Hiring of Transport while not having arrangements for fieldwork	3,900.00
12.	Rent of office cum residential accommodation	4,500.00
13.	Postage, telegrams, stamps etc.	100.00
14.	Telephone charges	1,500.00
15.	Train ticket Karachi to Pehsawar	391.00
16.	Olympia typewriter (£40)	
	TOTAL	24,774.50

EXPENDITURE FOR THE MONTHS OF APRIL AND MAY 1976

	Description	Rupees
1.	Pay of Consultant	4,000.00
2.	Pay of Male Interviewer	800.00
3.	Pay of Contactman	400.00
4.	Pay of Female Assistant	400.00
5.	Pay of Cleaner	300.00
6.	Pay of Chaukidar	700.00
7.	Pay of Driver	600.00
8.	Petrol, oil and maintenance for February and March (left out of last statement)	217.84
9.	Petrol, oil and maintenance cost for April	1,077.75
10.	Petrol, oil etc. for May	829.78
11.	Stationery, printing of tabulation sheets etc.	289.00
12.	Postage & telegrams etc. (the receipts are retained in case these are required for missing letters)	84.70
13.	Rent of office cum residential accommodation, telephone charges etc. (receipts not yet received)	4,000.00
	TOTAL	13,699.07

EXPENDITURE FOR THE MONTH OF JUNE & JULY 1976

	Description	Rupees
1.	Pay of Consultant	4,000.00
2.	Pay of Male Interviewer	800.00
3.	Pay of Contactman	400.00
4.	Pay of Female Assistant	400.00
5.	Pay of Cleaner	300.00
6.	Pay of Chaukidar	700.00
7.	Pay of Driver	600.00
8.	Petrol, oil and maintenance costs	
	June	724.25
	July	511.50
9.	Stationery etc.	63.35
10.	Postage & telegrams	100.00
11.	Rent of Office cum residential accommodation, telephone, water supply and electricity etc.	4,000.00
	(receipt for April/May included)	
	TOTAL	12,599.10

EXPENDITURE FOR THE MONTHS OF AUGUST, SEPTEMBER AND OCTOBER 1976

1.	Pay of Consultant	Rs.	6,000.00
2.	Pay of Male Interviewer		1,200.00
3.	Pay of Contactman		600.00
4.	Pay of Female Assistant		600.00
5.	Pay of Cleaner		450.00
6.	Pay of Chaukidar		1,050.00
7.	Pay of Driver		900.00
8.	Petrol, oil and maintenance of jeep:		
	August		1,056.93
	September		616.00
	October		627.30
9.	Stationery		24.25
10.	Postage etc.		80.00
	TOTAL		13,204.48

EXPENDITURE FOR THE MONTHS OF NOVEMBER, DECEMBER 1976 AND JANUARY, FEBRUARY, MARCH 1977

	Description	Rupees
1.	Pay of Consultant	10,000.00
2.	Pay of Male Interviewer	800.00
3.	Pay of Contactman	400.00
4.	Pay of Female Assistant	1,000.00
5.	Pay of Cleaner	1,250.00
6.	Pay of Chaukidar	1,050.00
7.	Pay of Driver	900.00
8.	Petrol, oil and maintenance cost of jeep, November and December 1976 and January 1977	741.70
9.	Stationery and postage etc.	100.00
10.	Rent of office cum accommodation, water, electricity etc.	
	a) arrears for the months of August, September and October 1976	6,000.00
	b) for the months of November and December 1976 and January, February and March 1977	10,000.00
	TOTAL	32,241.70

BIBLIOGRAPHY

ADLAKHA, A. (1972). 'Model life tables: an empirical test for their applicability to less developed countries', Demography, IX, 1, 589-601.

ADLAKHA, A. and D. KIRK. (1974). 'Vital rates in India 1961-71. Estimated from the 1971 Census data', Population Studies, XXVIII, 3, 381-400.

AHMAD, A. (1972). 'The Sex Ratio of Pakistan'. Unpubl. M.Sc. thesis. University of London, LSHTM.

AHMED, A.S. (1976). Millennium and Charisma among Pathans. A critical essay in social anthropology. London: Routledge & Kegan Paul Ltd.

______ (1977). Social and Economic Change in the Tribal Areas. Karachi: OUP.

ARMITAGE, P. (1971). Statistical Methods in Medical Research. Oxford and Edinburgh: Blackwell Scientific Publications.

ASRAF, K. (1962). Tribal People of West Pakistan. A demographic study of a selected people. NWFP: The Board of Economic Enquiry.

BARCLAY, G.W. (1966). Techniques of Population Analysis. New York: John Wiley & Sons, Inc.

BARTH, F. (1959). Political Leadership among Swat Pathans. London: Athlone Press.

BELLEW, H.W. (1879). Afghanistan and the Afghans. A brief review of the history of the country and account of its people. London: Sampson Low, Marston, Searle & Rivington.

BLACKER, J.G.C. (1977). 'The estimation of adult mortality in Africa from data on orphanhood', Population Studies, XXXI, 1, 107-128.

BOSERUP, ESTER (1970). Women's Role in Economic Development. London: Allen & Unwin.

BRASS, W. (1963). 'The construction of life tables from child survivorship rates', The International Population Conference, New York, 1961. London: IUSSP, I, pp. 294-301.

_______ (1964). 'Uses of census and survey data for the estimation of vital rates', African Seminar on Vital Statistics. Addis Ababa: UNECA.

_______ (1971a) 'A critique of methods for estimating population growth in countries with limited data', Proceedings of the 38th Session, Washington, Bulletin of the International Statistical Institute, XLIV, 1, pp. 397-412.

_______ (1971b) 'On the scale of mortality', in Biological Aspects of Demography. Ed. W. Brass. London :Taylor & Francis Ltd., pp. 69-109.

_______ (1975). Methods for Estimating Fertility and Mortality from Limited and Defective Data. Chapel Hill, North Carolina: Poplab.

BRASS, W. and A.J. COALE(1968). 'Methods of analysis and estimation', in The Demography of Tropical Africa. Ed. W. Brass. Princeton: Princeton University Press, pp. 88-150.

BRASS, W. and K. HILL (1973). 'Estimating adult mortality from orphanhood', International Population Conference, Liège, 1973. Liège: IUSSP, III, pp. 111-123.

BRSFM (1977). Report on the 1974 Bangladesh Retrospective Survey of Fertility and Mortality. Dacca: Census Commission, Statistics Division, Ministry of Planning.

BUVINIC, M. (1976). Women and World Development. An annotated bibliography . Washington: Overseas Development Council.

CAROE, O. (1956). The Pathans. London: Macmillan & Co. Ltd.

CARRIER, N. and J. HOBCRAFT. (1971). Demographic Estimation for Developing Countries. London: PIC.

CHANDRASEKAR, C. and W.E. DEMING (1949). 'On a method of estimating birth and death rates and the extent of registration', Journal of the American Statistical Association, XLIV, 101-115.

COALE, A.J. and E.M. HOOVER (1959). Population Growth and Economic Development in Low-Income Countries. Oxford: OUP.

COALE A.J. and P. DEMENY (1966). Regional Model Life Tables and Stable Populations. Princeton: Princeton University Press.

COPLAN, C. (1967). 'Some aspects of nutrition in India', in Patterns of Population Change in India, 1951-61. Ed. A. Bose. Bombay: Allied Publishers, pp. 101-108.

CROOKE, W. (1896). The Tribes and Castes of the North Western Provinces and Oudh. 4 vols, Calcutta: Office of the Superintendent of Government Printing, India.

_______ (1897). The North-Western Provinces of India. London: Methuen.

DARLING, M.L. (1934). Wisdom and Waste in the Punjab Village. London: OUP.

DAVIS, K. (1951). The Population of India and Pakistan. Princeton: Princeton University Press.

DUBLIN, L.I. (1936). 'Maternal mortality and the decline of the birth rate', Annals of the American Academy of Political and Social Science, CLXXXVIII, 107-116.

DUBLIN, L.I., A.J. LOTKA and M. SPIEGELMAN (1949). Length of Life, New York: The Ronald Press Company.

EATON, J. W. and A.J. MAYER (1954). Man's Capacity to Reproduce. The demography of a unique population. Glencoe, Illinois: The Free Press.

EL-BADRY, M.A. (1971). 'Higher female than male mortality in some countries of South Asia', Proceedings of the International

Population Conference, 1969. Liège: IUSSP, II, pp. 863-876.

GORDON, J.E., J.B. WYON and W. ASCOLI (1967) 'The second year death rate in less developed countries', American Journal of Medical Science, CCLIV, 357-380.

HILL, K. (1977). 'Estimating adult mortality levels from information on widowhood', Population Studies, XXXI,1, 75-84.

HILL, K. and J. TRUSSEL (1977). 'Further developments in indirect mortality estimation', Population Studies, XXXI, 2, 313-334.

HONIGMANN, J.J. (1957). 'Woman in West Pakistan', in Pakistan. Society and culture. Ed.Stanley Maron. New Haven:HRAF,pp.135-153.

______ (1958). Three Pakistan Villages. Chapel Hill: Institute for Research in Social Science.

INDIA (1901). Report of the Census of 1901.

______ (1911). Report of the Census of 1911.

______ (1921). Report of the Census of 1921.

______ (1931). Report of the Census of 1931.

JAIN, S.P. (1967). 'Some aspects of mortality', Patterns of Population Change in India, 1951-61. Ed. A. Bose. Bombay: Allied Publishers, pp. 319-333.

JAMES, H.R. (1862). Report on the Settlement of Peshawar District. Lahore: Dependent Press.

______ (1865). Report on the Settlement of Peshawar District. Lahore: Dependent Press.

JONES, L.J. (1941). 'The Status of Women in Islam'. Unpubl. M.A. thesis. University of Wales.

KHAN, A.H., M. KHAN and F. SHAH (1974). Review of the Daudzai Pilot Project, 1972-1974. Peshawar; PARD.

KHAN, M. and F. SHAH (1973). Daudzai Annual Progress Report. Peshawar: PARD.

KISH, L. (1965). Survey Sampling. New York: Wiley.

KROTKI, K.J. and N. AHMED (1964). 'Vital rates for East and West Pakistan: tentative results of the PGE experiment', Pakistan Development Review, III, 4, 734-759.

LINTON, R. (1961). 'Status and role', in Theories of Society. Foundations of modern sociological theory. Ed. T. Parsons et al. New York: The Free Press of Glencoe, pp. 202-208.

MEER, HASAN ALI Mrs (1882). Observations on the Mussulmanns of India. Ed. W. Crooke. London: OUP.

MERK, W.R.H. (1898). Report on the Mohmands. Lahore: Punjab Government Press.

MOSER, C.A. and G. KALTON (1971). Survey Methods in Social Investigation. London: Heinemann Educational Books Ltd.

MURRAY, J.W. (1899). A Dictionary of the Pathan Tribes. Calcutta: Office of the Printing Superintendent, Government Printing India.

MYRDAL, G.K. (1968). Asian Drama. An inquiry into the poverty of nations. 3 vols. Penguin Books Ltd.

NWFP (1883). 'Village Pedigree Registers'. Unpubl. Peshawar.

—— (1884). Gazetteer of Peshawar District (1883-84). Calcutta: Culcutta Central Press.

—— (1931). North West Frontier Province Gazetteer 1931. Lahore: Civil & Military Gazette Ltd.

PAKISTAN (1951). Census of Pakistan. Report and Tables. Karachi: Statistical Office.

________ (1961). Census of Pakistan. Report and Tables. Karachi.

________ (1973). Census of Pakistan 1971. Cited by M. Khan and F. Shah, Facts and Figures. Peshawar: PARD.

PENNEL, T.L. (1909). Among the Wild Tribes of the Afghan Frontier. London: Seeley & Co. Ltd.

PGE (1968). Report of the Population Growth Estimation Experiment. Description and some results for 1962-1963. Karachi: PIDE.

POPULATION COUNCIL (1970). A Manual for Surveys of Fertility and Family Planning: Knoweledge, Attitudes and Practice. New York: Key Book Service.

PRESTON, H.,N. KEYFITZ and R. SCHOEN (1972). Causes of Death. Life tables for national populations. New York:Seminar Press.

RIDGWAY, R.T.I. (1910). Pathans, (Handbooks for the Indian Army). Calcutta: Office of the Printing Superintendent, Government Printing India.

RIHAM, M. and J. JOY (1978). Development as if Women matter. A Third World Focus: an annotated bibliography. Washington: Secretariat for Women in Development of the New Trans-Century Foundation.

ROSE, H.A. (1905). 'Muhammadan pregnancy observances', Journal of the Anthropological Institute, XXXV, 279-282.

______ (1919). A Glossary of the Tribes and Castes of the Punjab and North West Frontier Province. 3 vols. Lahore: Office of the Superintendent, Government Printing India.

RUKANUDDIN, A.R. (1967). 'A study of the sex ratio in Pakistan', in Studies in the Demography of Pakistan. Ed. W. Robinson. Karachi: PIDE, pp. 147-225.

SPAIN, J.W. (1957). 'Pathans of the Tribal Area', in Pakistan. Society and culture. Ed. Stanley Maron. New Haven: HRAF, pp. 135-153.

______ (1975). The Way of the Pathan. Karachi: OUP.

STOLNITZ, G.J. (1956). 'A century of international mortality trends', Population Studies, X, 1, 17-42.

SULLIVAN, J.M. (1972). 'Models for the estimation of the probabilities of dying between birth and the exact ages of early childhood', Population Studies, XXVI, 1, 79-97.

SWINSON, A. (1967). North West Frontier. London: Hutchinson.

UNITED NATIONS (1947). Studies of Census Methods. New York: Population Division.

______ (1948a). The Labour Force. Problems of census definition and enumeration. New York: Population Division and International Labour Organization.

______ (1948b). Problems of Defining and Identifying and Measuring the Agricultural Population. Rome: FAO.

_______ (1948c). Birthplace, Nationality or Citizenship and Language. Problems of census enumeration and definitions. New York: Population Division.

_______ (1949a). Population Census Methods. New York: Department of Economic Affairs, Statistical Office.

_______ (1949b). Tabulations of Age, Marital Status and Educational Characteristics in Population Censuses. New York: Statistical Office.

_______ (1953). The Determinants and Consequences of Population Trends. New York: Population Division.

_______ (1955), Age and Sex Patterns of Mortality. Model life tables for underdeveloped countries. New York: Population Division.

_______ (1967a). Methods of Éstimating Basic Demographic Measures from Incomplete Data. New York: Population Division.

_______ (1967b). Principles and Recommendations for the 1970 Population Censuses. New York: United Nations.

_______ (1967c). The Human Rights Declaration on the Elimination of Discrimination against Women. New York: United Nations.

_______ (1974). Manual on Demographic Sample Surveys in Africa. Addis Ababa: UNECA.

VISARIA, P.M. (1967). 'The sex ratio of the population of India and Pakistan, and regional variations during 1901-61', in Patterns of Population Change in India, 1951-61. Ed. A. Bose. Bombay: Allied Publishers.

_______ (1969). 'Mortality and fertility in India, 1951-1961', Milbank Memorial Fund Quarterly, XLVII, I, 91-116.

VREELAND, H.H. (1957). 'Pathans of the Peshawar Valley', in Pakistan. Society and culture. Ed. Stanley Maron. New Haven: pp. 105-133.

WHO (1966). 'Sampling methods in morbidity surveys and public health investigation', World Health Organization Technical Report Series, 336. Geneva: WHO.

WRAY, J.D. (1971). 'Population pressure on familes: family size and child-spacing', Population Council Report, IX, 403-461.

WYON, J.R. and J.E. GORDON (1971). The Khanna Study. Population problems in the rural Punjab. Cambridge, Mass.: Harvard University Press.

YATES, F. (1960). Sampling Methods for Censuses and Surveys. London: Griffen.